CLASS 451, ABRADING

SECTION I - CLASS DEFINITION

While theoretically all abrading (or grinding) may be said to involve a cutting action, the cutting instrument being a natural one, for example, the sharp edges of randomly oriented crystals, as opposed to the teeth of a file, milling tool, or the like, nevertheless there is a practical distinction between an abrading (or grinding) device on the one hand, and a cutting device on the other, as means of working various materials, which is sufficiently well understood throughout the industrial world to permit this distinction to be made in the classification of inventions relating to such devices. The present classification therefore excludes any and every form of cutting, milling, or filing if the abrading is done with materials of sufficiently fine grain to produce a light-reflecting surface or polish. The term "abrading" may include a polishing device that acts by removal of an integral portion of the material acted upon, but not such as depends upon the application of a coating capable of taking a polish by friction or upon a compression, consolidation, or swaging of the material, for which see Lines With Other Classes and Within This Class, below.

Every invention relating to abrading must have to do either with an abrading element; a tool consisting of an abrading element or material and a holder by which it may be put to use; a machine embodying an abrading material or tool and means for moving it or the work, or an action equivalent to that of a tool; a holder for the work; a method or process of abrading; an attachment or accessory to a tool, machine, or process; or a plurality of these features. An abrasive tool distinguished solely by the abrasive material or composition will be found elsewhere. See References to Other Classes, below.

Abrading machines are herein broadly classed under either of two headings, viz., an abrading machine using a tool or material of definite shape or character or an abrading machine having no such tool or material. The known types of tool are an endless band of abrasive material, a nonrotary block or pad, and a rotary cylinder or disk. Machines using a tool are differentiated from one another, first, by the character of the tool as to the motion given thereto or by the absence of such motion, its function being accomplished by movement of the work, and, second, by the manner of handling the work.

A moving tool has either a continuous longitudinal motion in one direction, a reciprocating motion, a rotary motion, or a combination of two or more of these motions. In the present classification, no patents are placed under the title "Machine, Reciprocating Tool" in which the tool has other than a reciprocating movement, nor any under the title "Rotary Tool" in which it has other than a rotary motion. Those combining these motions are placed under the title "Machine, Rotary Reciprocating Tool." As to the second differentiation for machine, it is to be noted that there is scarcely a type of work-handling means which has not been applied to and used with each and every type of tool.

In the case of a machine using a rotary tool, a further differentiation is based upon whether the abrading is done by the peripheral or curved face or by the radial or diametrical plane face of the tool or by a combination of abrading surfaces (for example, a cup-shaped tool), and upon the pluralization of tools with opposed working faces, between which the work is treated.

In the case of a stationary tool machine, reciprocating tool machine, or tool, per se, differentiation is based upon the flexible or rigid characteristics of the tool.

An abrading machine is included which depends upon the use of an amorphous or loose granular mass of abrading material in which the work is immersed or through which it is passed or which is forcibly carried in contact with the work. This will be found under the title "By use of plural work holders, without tool" and the subclasses indented thereunder, and under the titles, "Machine"; "Machine, Rotary Tool"; "Sandblast"; or "Tumbling device" and the subclasses indented thereunder.

A machine which uses abrading instruments of more than one of the types recognized in this classification is placed under the title "Machine, combined"; and those in which an abrading means is inseparably organized with means for subjecting the material handled to other treatment are placed under the title "Machine, combined, with nonabrading operations."

With two exceptions (for which see Lines With Other Classes and Within This Class, below), apparatus in which the abrading operation is in the nature of cleaning by removal of foreign or extraneous material from the surface of the work rather than of an integral portion of the work itself is classified in this class.

A shot-peening machine and process for removing material from a workpiece, as opposed to that for deforming or burnishing a workpiece surface, are found in this class.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

The present classification of abrading excludes any and every form of cutting, milling, or filing if the abrading is done with materials of sufficiently fine grain to produce a light-reflecting surface or polish. Abrading may include a polishing device that acts by removal of an integral portion of the material acted upon, but not such as depends upon the application of a coating capable of taking a polish by friction or upon a compression, consolidation, or swaging of the material, such as is involved in the method or a device classified in Class 29, Metal Working, subclasses 90.01+ and Class 144, Woodworking, subclass 49.

CLASS 15 EXCEPTIONS

Shotting apparatus for bottle cleaning is classified in Class 15, Brushing, Scrubbing, and General Cleaning and a machine or system for cleaning the inside of tubular work by passing a solid (sometimes abradant) cleaning instrumentality through such work in a fluid stream is also classified in Class 15. A device for cleaning by the use of brushes only, without an abradant and with or without a liquid, are excluded from this class (451) and will be found in Class 15.

SECTION III - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

12, Boot and Shoe Making, subclasses 70+ for a shoe burnishing machine and subclass 104 for a shoe burnishing tool.

15, Brushing, Scrubbing, and General Cleaning, subclass 3.5 for a machine or system for cleaning the inside of tubular work by passing a solid (sometimes abradant) cleaning instrumentality through such work in a fluid stream (and see also the search note under subclass 3.5 for a further statement of the line); subclass 95 for for shotting apparatus for bottle cleaning. (See Lines With Other Classes, above, above.)

26, Textiles: Cloth Finishing, subclass 28 for a device for treating cloth by rubbing with a sand paperlike surface.

29, Metal Working, subclass 28 for a lathe with a grinding attachment; subclass 89.5 for burning-in, wearing-in, and oil burnishing; and subclasses 90.01+ for a burnishing process or apparatus. (see Lines With Other Classes, above)

30, Cutlery, subclasses 35+ for a razor with a sharpening feature, subclasses 138+ for a knife with a sharpening feature, or subclasses 329+ for a holder for a detachable blade with a sharpening feature, which sharpening feature may be used during normal use of the knife or may be used during sharpening of the blade. See the line expressed in the (2) Note after the definition of Class 30, subclasses 451+, for a pencil-sharpening implement including a statically related tool and work holder or work guide.

44, Fuel and Related Compositions, subclass 643 for a match scratcher composition or structure.

51, Abrasive Tool Making Process, Material, or Composition, for an abrasive tool distinguished solely by the abrasive material or composition is to be found in Class 51. A nominal recitation of an abrasive tool with a specific composition will be found in Class 51. (Also see the Class Definition, above.)

51, Abrasive Tool Making Process, Material, or Composition, for the process or method of making an abrading tool or material to be used in the device or process of Class 451.

69, Leather Manufactures, subclass 38 for a rotary tool machine having a tool grinder.

72, Metal Deforming, subclass 53 for shot blasting (or peening) to deform the surface of a metallic member.

76, Metal Tools and Implements, Making, subclasses 82+ for a process or apparatus relating to tool sharpening by the removal of stock adjacent to the edge of same by a cutting or filing action as distinguished from an abrading action.

99, Foods and Beverages: Apparatus, particularly subclasses 518+, 560+, and 623+ for apparatus for abrading vegetable material for the purpose of hulling or removing the peeling.

125, Stone Working, for a process of or apparatus for operating on stone other than by abrading a surface thereof (roughening, polishing).

132, Toilet, subclass 75.6 and 76.4+ for a manicuring abrader.

137, Fluid Handling, subclasses 243+ for a reciprocating disk or plug valve with a regrinding feature.

144, Woodworking, (see the Class Definition for Woodworking), subclass 38 for planing combined with polishing of wood; subclass 47 for turning combined with polishing; and sub-

classes 28.1+ for a pencil-sharpening machine which may include an abrasive tool.

157, Wheelwright Machines, subclass 13 for apparatus and process for treating the outer periphery of a rubber tire casing by a slitting, or another machine operation other than abrading, which (in the absence of this subclass) would ordinarily be classified in accord with the particular operation. (The treating of a rubber casing by abrading is classified elsewhere.)

173, Tool Driving or Impacting, for subject matter directed to driving or impacting a tool, when such subject matter includes combined features peculiar to tool driving, but which does not include features limiting the subject matter to a specific tool art, such as specific shape of the work contacting portion of a tool, related tools, or an opposed work support.

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 93 for electrolytic coating in which a solid material or member other than an electrode contacts the coating as it is formed, subclass 222 for electrolytic coating combined with subsequent contacting of a coated layer with a solid member or material (e.g., buffing, burnishing, polishing, etc.), and subclasses 640+ for electrolytic erosion to change the shape or surface configuration of an object, especially subclasses 661 and 662+ for electrolytic erosion combined with mechanical abrasion.

209, Classifying, Separating, and Assorting Solids, subclass 67 and 191 for a mercury adhesion or gravity-type separator combined with means for rubbing the solids.

210, Liquid Purification or Separation, subclass 353 for a filter combined with a loose-abrasive cleaning means.

241, Solid Material Comminution or Disintegration, for a comminuting process or apparatus which may involve an abrading action. See Lines With Other Classes and Within This Class in Class 241 for the line.

335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclass 283 for a blade sharpening or conditioning-type magnet device.

366, Agitating, for an agitating apparatus and method where there is no abrading or surface-finishing use disclosed.

396, Photography, subclasses 658+ for photos:graphic burnishing.

409, Gear Cutting, Milling, or Planing, subclasses 64+ for apparatus disclosed as useful with either a milling or an abrading tool.

426, Food or Edible Material: Processes, Compositions, and Products, particularly subclass 483 for a process of removing the outer covering of plant material by abrading.

427, Coating Processes, subclasses 289+ for a coating process combined with abrading.

433, Dentistry, subclass 125, 142, and 166 for dental abrading and polishing means.

451, Abrading, for treating of a rubber casing by abrading.

483, Tool Changing, for a transfer means for plural, separate tools between storage and a work station.

493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, subclass 271 for a tube-making machine which burnishes to minutely change the size of the tube.

523, Synthetic Resins or Natural Rubbers, subclasses 149+ for a composition containing a synthetic resin having utility as a friction element or to a process of preparation thereof.

901, Robots, subcollection 41 for a tool on the end of a robot arm.

SUBCLASSES

1 PRECISION DEVICE OR PROCESS - OR WITH CONDITION RESPONSIVE CONTROL:

This subclass is indented under the class definition. Process or apparatus comprising use of means for regulating and limiting the depth of cut of the grinder by controlling the feed of the grinder toward the work or of the work toward the grinder.

(1) Note. Means for regulating and limiting the depth of cut of the grinder are often referred to as “sizing” devices.

(2) Note. The above definition is as it has been for a long time (except that it now includes processes) and under which the indented subclasses (except subclasses 2 and 76) are defined. It is intended that the “condition responsive” art will be collected in this and the indented subclasses, to be defined in the future, as

follows: WITH CONDITION RESPONSIVE CONTROL: Abrading (or grinding) under the class definition including the process of or means for: (1) detecting any of the following characteristics: (a) a state or a property; (b) a change in a state or property or an occurrence of a predetermined event in any of the following: (i) a workpiece being abraded; (ii) the abraded product; (iii) the abrading machine or tool; or (iv) the environment of the machine or tool affecting the operation thereof; and (2) initiating or modifying (as a direct result of such detection) a force or impulse other than that generated or transmitted by the detecting means; and, (3) regulating or modifying (as a direct result of such initiation) the operation.

(3) Note. This definition requires that a patent claim at least four instrumentalities or use of same, for original placement herein. One of these is an abrading device. The other three are: (a) a sensor (e.g., a photocell system, trip lever, pressure diaphragm, etc.) to detect a condition stated in (a) of the definition; (b) an activator (e.g., an element to make or break an electric circuit, a clutch, a valve, etc.) to cause a release of energy more than or different from that accounted by mere change in condition (e.g., position, movement, etc.) of the sensor while it is functioning; and, (c) a controller (e.g., a motor or driver for said apparatus) to change or cause the operation of said apparatus. Therefore, a cam follower (or sensor) directly linked to a controller, whereby follower movement directly effects controller movement, is not proper subject matter for this subclass due to lack of an activator as defined. However, the same claimed structure is included herein if, for example, a claimed cam follower is disclosed as breaking an electrical circuit that energizes a motor.

(4) Note. A voluntary act of the person operating the machine (the "operative") is not proper subject matter for this subclass; e.g., disclosure of an abrading machine having an on/off switch adapted to be manipulated by the operative to start or stop the machine (even though the switch initiates a release of energy) is not included under the limitations of this definition.

2 Condition responsive control for sandblasting:

This subclass is indented under subclass 1. Subject matter , as set forth in the (2) Note, including use of means to propel a stream of fluent abrasive material to effect the abrading operation.

(1) Note. The stream may be propelled either by a compressed fluid (i.e., a gas or a liquid), a magnetic field, or a mechanical centrifugal device.

(2) Note. The fluent abrasive material herein may be sand or any other particulate material that will perform in like manner when propelled against a workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:

38+, for a sandblasting process without condition responsive control.

75+, for a sandblasting apparatus without a condition responsive control means.

3 Cyclic control:

This subclass is indented under subclass 2. Subject matter including use of means having the capacity to program or regulate a sequence of operations and capable of programming or regulating this sequence of operations so that once the means is initiated, no manual intervention is required for the machine to perform the sequence of operations.

4 Tape controlled:

This subclass is indented under subclass 1. Subject matter in which the operation is regulated in response to information stored on a band member.

SEE OR SEARCH CLASS:

408, Cutting by Use of Rotating Axially Moving Tool, subclass 3 for similar control structure for a boring or drilling machine.

409, Gear Cutting, Milling, or Planing, subclass 2, 79, and 289 for similar control of a gear cutting, milling, or planing machine.

5 Computer controlled:
This subclass is indented under subclass 1. Subject matter in which the operation is regulated by an electronic device capable of performing calculations, or compiling, correlating, or selecting data.

6 By optical sensor:
This subclass is indented under subclass 1. Subject matter in which a light responsive means regulates the abrading operation.

(1) Note. Included herein is a device in which a beam of light is reflected from the workpiece or an index mark thereon to the light sensitive means; a micrometer operably connected to a light source; or a device in which a tool or a workpiece covers or uncovers the light sensitive means for sensing a condition of the tool or the workpiece.

7 Controlling temperature:
This subclass is indented under subclass 1. Subject matter using or having means which regulate the thermal level of the abrading machine or of the workpiece.

8 With indicating:
This subclass is indented under subclass 1. Subject matter combined with using means to show the status or action of the abrader or the workpiece.

SEE OR SEARCH CLASS:
340, Communications: Electrical, subclass 680 for an electrical automatic condition-responsive indicating system for a machine tool.

9 Of tool or work holder position:
This subclass is indented under subclass 8. Subject matter using or including means to show the location of an abrading tool or workpiece gripping means.

10 And feeding of tool or work holder:
This subclass is indented under subclass 8. Subject matter combined with the use of means to relatively move an abrading tool and workpiece gripping means.

11 With feeding of tool or work holder:
This subclass is indented under subclass 1. Subject matter combined with use of means to relatively move an abrading tool and workpiece gripping means.

12 And use of moving abutment:
This subclass is indented under subclass 11. Subject matter combined with use of means which shifts the position of a movement blocking member relative to the tool or work holder.

13 Moved by cam:
This subclass is indented under subclass 12. Subject matter in which the position of the blocking member is changed by engagement of an eccentric surface of a rotary member.

14 Screw actuated:
This subclass is indented under subclass 11. Subject matter wherein the abrading tool is caused to move with respect to the work holder by a member adapted to turn about an axis, the member having a helical thread adapted to engage a relatively movable second member and force relative displacement of the second member upon rotation of the helically threaded member.

15 Manually adjustable:
This subclass is indented under subclass 14. Subject matter in which the position of the helical means is set by the hand of the operative.

16 Ratchet and pawl drive:
This subclass is indented under subclass 14. Subject matter including use of a circular toothed wheel (i.e., ratchet wheel) which is held in position or propelled by a feather (i.e., pawl), which wheel serves to turn the screw.

17 Sizing gauge controlled:
This subclass is indented under subclass 16. Subject matter including use of a selected removable member of a physical configuration to regulate the operation.

18 **Cam actuated:**
This subclass is indented under subclass 16. Subject matter wherein the ratchet is caused to move by engagement of an eccentric surface of a rotary member.

19 **Hydraulically driven:**
This subclass is indented under subclass 16. Subject matter actuated by fluid pressure means.

20 **Table dog actuated:**
This subclass is indented under subclass 16. Subject matter actuated by reciprocating means which moves back and forth with a carriage.

21 **Tool wear compensation:**
This subclass is indented under subclass 11. Subject matter comprising means to make allowance for the deterioration or impairment of the tool caused by wear.

22 **Sizing gauge controlled:**
This subclass is indented under subclass 21. Subject matter including use of a selected removable member of a physical configuration to regulate the operation.

23 **Cam actuated:**
This subclass is indented under subclass 11. Subject matter wherein the feeding means is caused to move by engagement of an eccentric surface of a rotary member.

24 **Hydraulically driven:**
This subclass is indented under subclass 11. Subject matter actuated by fluid pressure means.

25 **Sizing gauge controlled:**
This subclass is indented under subclass 24. Subject matter including use of a selected removable member of a physical configuration to regulate the operation.

26 **Control means near and parallel to the abrader:**
This subclass is indented under subclass 24. Subject matter in which control means therefor is relatively close and parallel to the grinder.

27 **Tool interior of workpiece:**
This subclass is indented under subclass 11. Subject matter in which the tool moves internal of a workpiece.

(1) Note. The apparatus is commonly referred to as a honing device.

28 **ABRADING PROCESS:**
This subclass is indented under the class definition. Method of performing a grinding operation falling within the main ... or method of performing an ancillary operation not elsewhere provided for.

(1) Note. For a process of making an article or blank wherein abrading is included in addition to metal working, see the appropriate metal working class.

SEE OR SEARCH CLASS:

29, Metal Working, subclass 89.5 and 90.01+ for a process of wearing-in or burnishing metal.

51, Abrasive Tool Making Process, Material, or Composition, for a process of making an abrading tool, material, or composition.

134, Cleaning and Liquid Contact With Solids, for a process of cleaning and liquid contact with solids not involving (a) the use of an abradant or (b) the causing of plural workpieces to tumble or rub against each other, particularly subclass 7 for a process involving the use of particulate or comminuted solid treating agents.

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 640+ for electrolytic erosion to change the shape or surface configuration of an object, especially subclasses 661 and 662+ for electrolytic erosion combined with mechanical abrasion.

426, Food or Edible Material: Processes, Compositions, and Products, subclass 483 for a process of removing the outer covering of plant material by abrading.

29 Utilizing shield (mask or stencil):
This subclass is indented under subclass 28. Method wherein an abradant-resist is relied on to define the work area and to protect underlying portions of the workpiece.

(1) Note. Included in this and indented subclasses is a process including application, formation, or modification of the resist on the work surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:
445, for an accessory including an abrading shield, and see search notes thereunder.

SEE OR SEARCH CLASS:
216, Etching a Substrate: Processes, particularly subclasses 41+ for a step in a chemical etching process of masking the substrate with an etch resist.

30 With in situ removal of nonresist portion of shield:
This subclass is indented under subclass 29. Method wherein, preliminary to erosion of the defined work area, a non-abrasion-protective portion of the shield member is removed from a position overlying the work area.

(1) Note. Included herein is the method wherein an abradant in its initial function cuts through a nonresist portion.

SEE OR SEARCH THIS CLASS, SUBCLASS:
31, for preparation of modification of shield to define the work area.

31 With preparation of shield:
This subclass is indented under subclass 29. Method including forming or modifying the abradant-resist to define the work area.

(1) Note. Preparation as contemplated herein is not intended to include compounding of materials.

(2) Note. The broad application of a preformed shield to a workpiece is insufficient to define a step of "preparation" for this subclass.

32 Tumbling:
This subclass is indented under subclass 28. Method wherein abrading of one or more workpieces is accomplished during a series of free fall movements, or propulsions, resulting from forces imparted thereon by a work receptacle in motion (generally rotational), and wherein the abrading contact may be: (a) that of mutual attrition between similarly freely moving work bodies; and/or (b) that between a work body and the receptacle wall structure; and/or (c) that exercised by an encompassing fluent particulate mass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
36, for a process utilizing a fluent abradant.
326+, for corresponding apparatus.

SEE OR SEARCH CLASS:
99, Foods and Beverages: Apparatus, subclasses 485+ for means to treat food by agitating, tumbling, or vibrating.
241, Solid Material Comminution or Disintegration, subclass 5, 22, and 26 for a related process including mutual attrition and having the function of comminuting.

33 Including temperature modification or control:
This subclass is indented under subclass 32. Method auxiliary to the abrading operation and including, relative to work or tool, a step of heating, cooling, or maintaining a constant temperature condition.

SEE OR SEARCH THIS CLASS, SUBCLASS:
53, for a related process with another method of abrading.

SEE OR SEARCH CLASS:
83, Cutting, subclass 15 for a process of heating or cooling work ancillary to a cutting operation.

34 In at least one of plural abrading steps:
This subclass is indented under subclass 32. Method including sequential abrading operations one of which is by tumbling.

SEE OR SEARCH THIS CLASS, SUBCLASS:

37, for plural abrading operations in which one operation utilizes a fluent abradant.

57, for plural abrading operations, generally.

35 With auxiliary work treating or in critical fluent medium:

This subclass is indented under subclass 32. Method including (a) a nonabrading step of altering the state or shape of work to facilitate the tumbling operation; or (b) tumbling in a particularly defined fluid medium, abradant carrier, or atmosphere; or (c) any defined altering of state or shape of work or product by a claimed fluid medium, abradant carrier, or atmosphere in which the tumbling operation is accomplished.

SEE OR SEARCH THIS CLASS, SUBCLASS:

33, and 53, for a related process including temperature modification or control.

38, for a related process in blasting.

54, for work treatment with a method of abrading, generally.

SEE OR SEARCH CLASS:

83, Cutting, subclasses 14+ for a process of cutting including ancillary treatment of work.

36 Utilizing fluent abradant:

This subclass is indented under subclass 28. Method utilizing an unbonded particulate mass through or across which work is carried, or which accomplishes its cutting function during motion as a fluid body.

SEE OR SEARCH THIS CLASS, SUBCLASS:

32+, for abrading by tumbling.

59+, for a method of abrading in which an unbonded particulate film is dependent for cutting contact upon frictional forces thereon developed by a backup plate having motion relative to and paralleling the work surface.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclass 95 for cleaning hollow ware by agitation of particulate material within the ware.

29, Metal Working, subclasses 90.01+ for burnishing or compacting by shot blasting.

134, Cleaning and Liquid Contact With Solids, subclass 7 and 32 for cleaning by particulate materials.

37 Combined abrading:

This subclass is indented under subclass 36. Method including plural grinding operations one of which is performed on a single workpiece by a fluent abradant and occurs either concurrently with, but over a separately defined work surface, or sequentially with another grinding operation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

31, for sequential abrading steps including use of a mask or stencil.

34, for plural abrading steps including one by tumbling.

57+, for other plural distinct abrading areas or steps.

38 By blasting:

This subclass is indented under subclass 36. Method wherein cutting is accomplished by forceful propulsion of the particulate mass, as free flung bodies, against the work surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:

29+, for blasting including use of a mask or stencil, and see search notes thereunder.

36+, the subclass from which this subclass depends, especially subclass 37, for "liquid honing," a nonblasting scouring operation by a stream having motion substantially parallel to the work surface.

39 With nonsiliceous abradant:

This subclass is indented under subclass 38. Method of blasting wherein the abradant or at least a component of an abradant mixture is in

character other than a sand (i.e., silica) bearing material.

40 With nonatmospheric fluid carrier:
This subclass is indented under subclass 38. Method of blasting wherein the abradant is borne by a liquid or gas medium exclusive of air alone.

SEE OR SEARCH THIS CLASS, SUBCLASS:
29+, for blasting including use of a mask or stencil.
39, for blasting by an abradant inclusive of a nonsiliceous material.

41 Glass or stone abrading:
This subclass is indented under subclass 28. Method of grinding glass or natural or artificial stone.

SEE OR SEARCH CLASS:
65, Glass Manufacturing, subclass 37 for a process of lens making involving fusion bonding of glass and grinding, subclass 61 for a process of glassworking combined with grinding, and subclass 181 for glassworking or treating apparatus combined with grinding means.

42 Lens:
This subclass is indented under subclass 41. Method for grinding a member intended to transmit and refract light.

(1) Note. This subclass takes lens surface polishing as well lens generating.

SEE OR SEARCH THIS CLASS, SUBCLASS:
240, 255, 256, 277, and 323, for a lens grinding machine.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing, and General Cleaning, subclass 214 for a lens wiper, dauber, or polisher.
65, Glass Manufacturing, subclasses 37+ for a process of uniting glass to glass to make a multifocal lens with or without a step of grinding.
351, Optics: Eye Examining, Vision Testing and Correcting, subclass 177 for a miscellaneous method of making an ophthalmic lens.
359, Optics: Systems (Including Communication) and Elements, subclass 819 for a lens mount.

43 Edging:
This subclass is indented under subclass 42. Method directed to grinding or polishing a circumferential margin of a lens.

44 Edging:
This subclass is indented under subclass 41. Method directed to grinding or polishing a circumferential margin of a workpiece.

45 Razor, knife, or scissors sharpening:
This subclass is indented under subclass 28. Method for sharpening the cutting edge of cutlery comprising a razor, knife, or a blade of a pair of scissors by an abrading operation.

SEE OR SEARCH CLASS:
76, Metal Tools and Implements, Making, subclasses 82+, 89.1, and 89.2 for miscellaneous tool sharpening.

46 Gauge abrading:
This subclass is indented under subclass 28. Method for grinding a gauge member such as a plug gauge, Johanessen gauge, etc.

SEE OR SEARCH CLASS:
33, Geometrical Instruments, subclasses 501+ for a gauge, generally.

47 Gear or worm abrading:
This subclass is indented under subclass 28. Method for grinding a toothed or helical toothed wheel, cylinder, or similar machine element.

SEE OR SEARCH THIS CLASS, SUBCLASS:
48+, for a process for grinding a hob, reamer, or twist drill.
114+, for apparatus for grinding a gear by mutual contact between plural gears.
147+, for a gear grinder having a rotary reciprocating tool of the peripheral face type and a rotary gear holder.

237+, and 281, for a rotary tool in which the abrading action is controlled by a template.

SEE OR SEARCH CLASS:

409, Gear Cutting, Milling, or Planing, subclasses 66+ for a thread or helix milling process.

48 Drill, thread, thread cutter, reamer, or rotary cutter abrading:

This subclass is indented under subclass 28. Method for grinding a drill, a thread, a thread die or cutter, a reamer, or a rotary cutter such as a hob.

SEE OR SEARCH THIS CLASS, SUBCLASS:

47, for a process of grinding a worm.

SEE OR SEARCH CLASS:

76, Metal Tools and Implements, Making, subclass 102, 107.1+, and 108.1+ for other processes of making an auger, die, or drill.

408, Cutting by Use of Rotating Axially Moving Tool, subclass 18 for structure of that class type including a screw-threading tool combined with means to refurbish that tool; subclass 215 for a screw threading tool, per se.

409, Gear Cutting, Milling, or Planing, subclasses 66+ for a thread or helix milling process.

470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, for other processes of forming threads on such articles; except as provided for in Class 408.

49 Roll, roller, shaft, ball, or piston abrading:

This subclass is indented under subclass 28. Method for grinding a roll, roller, shaft including a spliced shaft, ball, sphere, or piston.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 888.04+, 895.3+, 898.068, 898.069, and 899+ for a metal working process involving more than mere grinding for making a roll or a piston.

50 Ball abrading:

This subclass is indented under subclass 49. Abrading process specifically directed to forming a spherical shaped workpiece by abrading (or polishing).

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 888.04+, 895.3+, 898.068, 898.069, and 899+, for a metal working process involving more than mere grinding for making a ball bearing or other ball.

51 Ring, tube, bushing, sleeve, or cylinder abrading:

This subclass is indented under subclass 28. Method for grinding a ring, tube, bushing, sleeve, cylinder, or the like requiring “internal” grinding.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 888.07+ for a process of making a piston ring involving more than grinding.

52 Bearing raceway:

This subclass is indented under subclass 51. Method for grinding a bearing raceway for a ball or roller bearing.

SEE OR SEARCH CLASS:

29, Metal Working, subclass 898.066 for a process of making a bearing raceway involving more than grinding.

53 With critical temperature modification or control of work or abradant:

This subclass is indented under subclass 28. Method auxiliary to the abrading operation and including, relative to work or tool, either a particularly defined thermal variation or control or else a detailed mode of accomplishing any heating, cooling, or constant temperature condition.

(1) Note. The sole disclosure of “cooling” or of “supplying a cooling liquid” is insufficient to define a “particularly defined” or “detailed mode...” as above, since liquid coolant is relied on in most abrading procedures.

SEE OR SEARCH THIS CLASS, SUBCLASS:

33, for a related process in connection with tumbling, and see the search notes thereunder.

36, for temperature modification or control due to the fluid carrier of a fluent abrasive, or occurring simultaneously with the fluent abrading step.

54 With critical nonabrading work treating:

This subclass is indented under subclass 28. Method auxiliary to the abrading step and wherein the workpiece is altered in shape or to a particularly defined state, or there is claimed specific manipulative steps for accomplishing any alteration of state or shape.

(1) Note. The sole disclosure of "cleaning" is insufficient to define the critical work treatment.

SEE OR SEARCH THIS CLASS, SUBCLASS:

35, for work treatment auxiliary to a tumbling operation, and see the search notes thereunder.

55 Deforming:

This subclass is indented under subclass 54. Method wherein the workpiece is altered in shape or dimension.

SEE OR SEARCH CLASS:

83, Cutting, subclass 17, 175, and 176 for work deformation with respect to cutting.

56 With tool treating or forming:

This subclass is indented under subclass 28. Method wherein the abradant, either particulate material or bonded tool, is altered in state or shape in preparation for, or as an incidence of, the abrading operation.

(1) Note. The mutual attrition between tool and workpiece is not considered to be "tool treating or forming."

SEE OR SEARCH THIS CLASS, SUBCLASS:

35, for work treatment auxiliary to a tumbling operation, and see the search notes thereunder.

SEE OR SEARCH CLASS:

51, Abrasive Tool Making Process, Material, or Composition, for an abrasive tool making process, material, or composition not elsewhere classifiable; and see the search notes thereunder.

57 Combined abrading:

This subclass is indented under subclass 28. Method wherein a workpiece is subjected to at least two abrading operations which are relative to one another and occur either (a) concurrently, but over separately defined work surfaces, or (b) in sequence.

SEE OR SEARCH THIS CLASS, SUBCLASS:

34, for plural abrading operations in which one operation is tumbling.

37, for plural abrading operations in which one operation utilizes a fluent abradant.

58 Utilizing mounted rigid abrading tool only:

This subclass is indented under subclass 57. Method wherein the only tool relied on is a machine element of nondeformable bonded abradant.

59 Utilizing nonrigid tool:

This subclass is indented under subclass 28. Method wherein abrasion is accomplished either by an unbonded particulate or a deformable tool (e.g., flexible, resilient).

SEE OR SEARCH THIS CLASS, SUBCLASS:

29+, for abrading by use of a nonrigid tool while using a shield.

32+, for abrading by tumbling, which may involve use of a nonrigid tool.

36+, for abrading by use of a fluent abradant.

60 Abradant supplying:
This subclass is indented under subclass 28. Method for supplying abrasive materials to the abrading zone or zones.

SEE OR SEARCH THIS CLASS, SUBCLASS:
99+, for a sandblast nozzle, supply tank, or valve.
446+, for abradant supplying apparatus.

61 Hollow work:
This subclass is indented under subclass 28. Method for abrading an interior surface of a workpiece.

62 Cam:
This subclass is indented under subclass 28. Method for abrading a plate or cylinder which is intended to communicate motion to a follower by means of its edge or a groove cut in its surface.

63 Side face of disk:
This subclass is indented under subclass 28. Method for abrading a planar surface of a disk-shaped workpiece.

64 MACHINE:
This subclass is indented under the class definition. A complete abrading assemblage comprised of moving components comprising: (a) A base mounted apparatus to which a workpiece is brought for the abrading operation, or (b) A sandblasting assemblage comprised of means for supplying an abrasive in free flight to a workpiece.

(1) Note. A sandblasting assemblage in this subclass may be randomly manipulated during use.

65 Combined:
This subclass is indented under subclass 64. Abrading machine having an abrading tool and another tool either (a) having a nonabrading function, or (b) having a distinct, different abrading function, wherein the first and second tools are mounted on a common frame.

SEE OR SEARCH THIS CLASS, SUBCLASS:
461+, for a tool having surfaces for performing an abrading operation and another operation

66 Scouring or polishing means:
This subclass is indented under subclass 65. Abrading machine including an abrading device acting to remove foreign matter from a workpiece rather than remove an integral portion therefrom.

SEE OR SEARCH THIS CLASS, SUBCLASS:
103, for a scouring machine not combined with an additional treating structure.

67 With nonabrading means:
This subclass is indented under subclass 65. Abrading machine including a grinding device of this class combined with a device for performing another operation cognate or accessory to the grinding operation.

SEE OR SEARCH CLASS:
29, Metal Working, subclass 28 for a combined machine characterized by a mechanism for relatively rotating the work and a turning or milling tool and which have in addition thereto a grinding mechanism.
144, Woodworking, subclasses 1.1+, 38, and 47 for combined woodworking and polishing.

68 Work deformer:
This subclass is indented under subclass 67. Abrading machine including an abrading device of this class combined with another device which stresses a workpiece beyond its elastic limit, but below the fracture point.

69 Cutter:
This subclass is indented under subclass 67. Abrading machine in which the other device has a sharp cutting edge.

70 Including abrader for cut surface:
This subclass is indented under subclass 69. Abrading machine wherein the grinding device is intended to abrade the surface of the workpiece previously engaged by the cutter.

71 Drill:

This subclass is indented under subclass 69. Abrading machine in which the other tool is intended to turn about an axis and move along that axis with respect to material being cut.

72 Having means to refurbish abrading tool:

This subclass is indented under subclass 67. Abrading machine provided with means which dresses or trues the grinding tool.

73 Adjunct:

This subclass is indented under subclass 67. Abrading machine in which the other device completes, makes up for a deficiency, or strengthens an operation on a workpiece.

74 Graining box:

This subclass is indented under subclass 64. Abrading machine comprising an open work receiving receptacle containing loose abrasive material overlying or underlying the work and which by relative movement of the work or the receptacle, or both, is caused to produce, upon a face of the work, a grained surface suitable for surface printing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

104+, and 113, for an immersion-type abrader.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 90.01+ for a burnishing apparatus or process.

209, Classifying, Separating, and Assorting Solids, subclasses 233+ for a solid material sifter and subclasses 422+ for stratifier.

75 Sandblast:

This subclass is indented under subclass 64. Abrading machine provided with means to propel a stream of fluent abrasive material to effect the abrading operation.

(1) Note. The stream may be propelled either by a compressed fluid (i.e., a gas or a liquid), a magnetic field, or a mechanical centrifugal device.

(2) Note. The fluent abrasive material herein may be sand or any other particulate material that will perform in like manner when propelled against a workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:

38+, for a sandblasting process.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 90.1+ for a machine or process for burnishing (i.e., condensing, compacting, smoothing, or polishing the surface of a metallic or nonmetallic article), including subjecting it to shot blasting.

118, Coating Apparatus, subclasses 308+ for apparatus for projecting particulate coating material against work.

122, Liquid Heaters and Vaporizers, subclass 393 for a sandblast boiler cleaner.

165, Heat Exchange, subclass 94 for a heat exchanger with scraping means removing a product from an exchange surface.

175, Boring or Penetrating the Earth, subclass 54 for means for forming a hole in the earth by below ground recirculation of unsupported elements (e.g., shot).

241, Solid Material Comminution or Disintegration, subclass 5 for the process of comminuting and subclasses 39+ for a comminutor in which material is propelled by a fluid blast.

291, Track Sanders, for means for applying sand or like material to the wheel tread of a vehicle or to the surface over which that wheel tread is to pass.

406, Conveyors: Fluid Current, for a pneumatic conveyor in general.

76 Hollow interior work:

This subclass is indented under subclass 75. Abrading machine specifically designed to perform an abrading operation on the interior surface of a generally hollow cylindrical workpiece.

(1) Note. The workpieces of this subclass may comprise a tube, pipe, or similar structure.

SEE OR SEARCH THIS CLASS, SUBCLASS:

381, for a work holder for supporting a hollow workpiece in an abrading machine.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclasses 3.5+ for cleaning of a tubular conduit. See the search note in reference to Class 451 in the subclass 3.5 definition for the line between these subclasses.

122, Liquid Heaters and Vaporizers, subclass 395 for a sandblaster specially adapted for or combined with a boiler.

77 Spark plug:

This subclass is indented under subclass 75. Abrading machine specifically designed to perform abrading operations on a fuel igniting device for an internal combustion engine.

SEE OR SEARCH CLASS:

445, Electric Lamp or Space Discharge Component or Device Manufacturing, subclass 7 for a method of making a spark plug or spark gap and subclasses 60+ for the corresponding apparatus.

78 Electrical device:

This subclass is indented under subclass 75. Abrading machine specifically designed to perform an abrading operation on an electrical device.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 592.1+ for a process of making an electrical device in general and subclasses 729+ for apparatus for assembling an electrical device.

79 File:

This subclass is indented under subclass 75. Abrading machine specifically designed to perform an abrading operation on a material working file.

(1) Note. Included in this subclass is a patent for cleaning and/or resharpening a file.

SEE OR SEARCH CLASS:

76, Metal Tools and Implements, Making, subclasses 12+ for file cutting in general.

80 Having moving work holder:

This subclass is indented under subclass 75. Abrading machine provided with means for securely supporting and moving the workpiece past the sandblasting means.

81 Endless belt type:

This subclass is indented under subclass 80. Abrading machine wherein the moving work holder consists of a belt or beltlike structure having an endless surface movable continuously along a path defined by its longitudinal axis.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclasses 804+ for an endless belt conveyor, per se.

82 Rotary:

This subclass is indented under subclass 80. Abrading machine in which the work holder turns about an axis to enable the workpiece to be rotated or moved in a circular path while being abraded.

(1) Note. For placement in this and indented subclasses, the axis of rotation of the work holder does not necessarily have to coincide with the axis of rotation of the workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:

106, 143+, 173, 210, 246+, 269, 285+, 307+, 324+, and 398+, for other rotary work holders used with an abrading machine.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclasses 793+ for a rotary conveyor, generally.

269, Work Holders, subclass 57 for a rotary work holder of general utility.

83 Rollers:
This subclass is indented under subclass 82. Abrading machine wherein the work holder consists of at least a pair of cylinders which physically engage and rotate the workpiece.

(1) Note. In addition to rotating the workpiece, the cylinders may convey the workpiece through the abrading area.

(2) Note. A machine including more than one "pair of cylinders" is included herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:
105, for a roller work feed for a scouring device.

SEE OR SEARCH CLASS:
198, Conveyors: Power-Driven, subclasses 780+ for a live roller conveyor, per se.

84 Table:
This subclass is indented under subclass 82. Abrading machine wherein the work holder is generally a flat, circular platform upon which the workpiece is placed.

SEE OR SEARCH THIS CLASS, SUBCLASS:
411+, for a rotary work table for abrading.

85 Having tumbling barrel:
This subclass is indented under subclass 75. Abrading machine provided with a cylindrical cage or rumble capable of rotating into which the workpiece is placed such that the workpiece is not securely held in the cage or rumble.

SEE OR SEARCH THIS CLASS, SUBCLASS:
326+, for an abrading tumbling device, generally.

86 And centrifugal particle propulsion means:
This subclass is indented under subclass 85. Abrading machine wherein the means to propel the stream of abrasive material is a revolving body from which the bits of abrasive material are propelled.

SEE OR SEARCH THIS CLASS, SUBCLASS:
94+, for a mechanical centrifugal propelling means for a sandblast machine, without a tumbling barrel.

87 Having particle recovery means:
This subclass is indented under subclass 75. Abrading machine provided with means to retrieve abrading particles subsequent to the abrading operation.

(1) Note. The sand or abrasive material may be mixed with workpiece particles generated by the abrading operation.

88 And separation means:
This subclass is indented under subclass 87. Abrading machine further provided with means to segregate the fluent abrasive material from workpiece particles generated by the abrading operation.

89 Having sandblast chamber:
This subclass is indented under subclass 75. Abrading machine provided with a substantially closed vessel into or through which the workpiece is placed or passed during the abrading operation.

90 Having hand-directed sandblast nozzle:
This subclass is indented under subclass 75. Abrading machine including a sandblasting or abrasive material stream directing terminal outlet capable of being hand manipulated.

SEE OR SEARCH THIS CLASS, SUBCLASS:
102, for nozzle structure, per se.

91 Abradant propulsion means:
This subclass is indented under subclass 75. Abrading machine including particular means to impel the fluent abrasive material against the workpiece.

92 Mobile machine:
This subclass is indented under subclass 91. Abrading machine provided with means capable of making the entire machine movable such that the machine can be easily transported to, from, or about the workpiece or work area.

SEE OR SEARCH CLASS:

901, Robots, subcollection 41 for a tool mounted on the end of a programmable robot arm.

93 Magnetic:

This subclass is indented under subclass 91. Abrading machine wherein the propelling means is capable of impelling the abrasive material by the use of a magnetic field.

94 Mechanical:

This subclass is indented under subclass 91. Abrading machine wherein the propulsion means propels the fluent abrasive material by means of a member which physically engages and forces the abrasive material into the stream.

SEE OR SEARCH THIS CLASS, SUBCLASS:

86, for a sandblast machine having a tumbling barrel and a centrifugal propulsion means for the sand.

SEE OR SEARCH CLASS:

241, Solid Material Comminution or Disintegration, subclass 275 for a centrifugal projecting apparatus for comminuting material.

95 Centrifugal batter with abradant supply:

This subclass is indented under subclass 94. Abrading machine wherein the propulsion means comprises a revolving body, including particular means for feeding abrasive material (or propellant) to the blast conduits in a sandblasting machine.

(1) Note. The propellant may be either a pressurized fluid and/or liquid. The term "propellant" is the medium which carries the abrasive material from the supply tank or hopper to the blasting nozzle and workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:

97, for a centrifugal batter wheel, per se.

96 Powered abradant supply:

This subclass is indented under subclass 95. Abrading machine wherein the propulsion means is provided with abrasive material which is caused to flow by means other than gravity.

97 Centrifugal batter:

This subclass is indented under subclass 91. Abrading machine drawn to impeller rotor specifically adapted for propelling abrasive material in a sandblasting machine.

SEE OR SEARCH CLASS:

416, Fluid Reaction Surfaces (i.e., Impellers), subclasses 179+ for a fluid impeller rotor in general.

98 Vane structure:

This subclass is indented under subclass 91. Abrading machine drawn to a particular impeller blade specifically adapted for propelling abrasive material in a sandblasting machine.

SEE OR SEARCH CLASS:

416, Fluid Reaction Surfaces (i.e., Impellers), subclass 233 for fluid impeller blade structure in general.

99 Abradant supply structure:

This subclass is indented under subclass 75. Abrading machine including particular means for feeding abrasive material (or propellant) to the blast conduits in a sandblasting machine.

SEE OR SEARCH THIS CLASS, SUBCLASS:

446+, for other abradant supply structure.

SEE OR SEARCH CLASS:

222, Dispensing, for a dispenser of pulverulent material in general.

239, Fluid Sprinkling, Spraying, and Diffusing, for other distributor structure, especially subclass 336 for the discharge of a fluent solid, and subclass 379 where the material to be projected is contained in a hopperlike receptacle usually used for solids.

291, Track Sanders, for a sand supply for applying traction-improving, abrasive material to a vehicle supporting rail.

406, Conveyors: Fluid Current, subclasses 108+ for a fluid current conveyor having feeding means.

100 Multiple hopper:
This subclass is indented under subclass 99. Abrading machine provided with at least two receptacles for holding the abrasive material wherein one receptacle feeds abrasive by gravity to a second receptacle which subsequently feeds abrasive to mixing chamber for the abrasive propellant.

(1) Note. The propellant may be a pressurized fluid and/or liquid. The term "propellant" is the medium which carries the abrasive material from the supply tank or hopper to the blasting nozzle and workpiece.

101 Valve structure:
This subclass is indented under subclass 75. Abrading machine provided with a flow controller specifically adapted for supplying fluent abrasive material to the blast conduit in a sandblasting machine.

SEE OR SEARCH THIS CLASS, SUBCLASS:
446+, for an abradant supplying accessory.

102 Sandblast nozzle structure:
This subclass is indented under subclass 75. Means including a particular sandblasting or abrasive material stream directing terminal outlet.

SEE OR SEARCH CLASS:
222, Dispensing, for a miscellaneous dispensing nozzle, and see the notes to sections 16, 17, and 19 for the distribution of art for sanding; abrading; material throwing, spraying, scattering, or dusting; and nozzles.
239, Fluid Sprinkling, Spraying, and Diffusing, for other distributor structure, especially subclass 336 for the discharge of a fluent solid and subclass 379 where the material to be projected is contained in a hopperlike receptacle usually used for solids.
417, Pumps, subclasses 151+ for a jet pump.

103 Scouring device:
This subclass is indented under subclass 64. Abrading machine for removing foreign or extraneous material from the surface of a workpiece rather than from an integral portion of the workpiece itself.

SEE OR SEARCH THIS CLASS, SUBCLASS:
66, for a combined machine involving scouring.
75+, for a sandblast-type abrading machine.
104+, and 113, for an immersion abrading machine.
328+, for a tumbling-type abrading machine.

104 Immersion:
This subclass is indented under subclass 103. Abrading machine especially adapted for scouring or removing foreign material from the surface of articles rather than removing an integral portion of the substance of the article itself and in which the work is submerged under a mass of granular abrasive material.

SEE OR SEARCH THIS CLASS, SUBCLASS:
113+, for an immersion abrader, generally.
328+, for a tumbling drum.

105 Roller work feed:
This subclass is indented under subclass 104. Abrading machine in which the work is passed by feed-rollers through a mass of granular abrasive material for the purpose of scouring or removing from the surface thereof foreign or extraneous matter.

SEE OR SEARCH THIS CLASS, SUBCLASS:
131, 172, 188+, 207+, and 301, for other roller work feeds.

106 Rotary work holder:
This subclass is indented under subclass 104. Abrading machine in which the work is carried by a gripping member that turns about an axis through a mass of granular abrasive material for the purpose of scouring or removing from the surface thereof foreign or extraneous matter.

SEE OR SEARCH THIS CLASS, SUBCLASS:

82+, 143+, 173, 210, 246+, 269, 285+, 307+, 324+, and 398+, for other rotary work holders used with an abrading machine.

107 Drawing reel:

This subclass is indented under subclass 104. Abrading machine in which the work (e.g., wire) is drawn by a winding-drum through a mass of granular abrasive material for the purpose of scouring or removing from the surface thereof foreign or extraneous matter.

SEE OR SEARCH THIS CLASS, SUBCLASS:

176, and 183, for other work feeds of this type.

108 Reciprocating scouring tool:

This subclass is indented under subclass 103. Abrading machine using a tool that moves to-and-fro for the application of granular abradant to a workpiece for the purpose of scouring (i.e., removing rust or other foreign material).

(1) Note. The workpiece may be a kitchen knife or a similar implement.

(2) Note. Removing rust or other foreign material is included herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

162+, for other reciprocating tools.

109 Rotary cylindrical scouring tool:

This subclass is indented under subclass 103. Abrading machine using the peripheral surface of a wheellike member of a shape which may be generated by a circle moved axially, which member turns about its central axis for the application of granular abradant to the workpiece for the purpose of scouring it (i.e., removing rust or other foreign material).

SEE OR SEARCH THIS CLASS, SUBCLASS:

178+, for other rotary cylindrical tools.

110 Opposed pair of scouring tools:

This subclass is indented under subclass 109. Abrading machine using opposed rotary cylinders for the simultaneous application of granular abrasive material to opposite sides of a workpiece for the purpose of scouring the same (i.e., removing foreign or extraneous materials).

SEE OR SEARCH THIS CLASS, SUBCLASS:

112, 132+, 194+, 262+, and 302, for other opposed tools.

111 Rotary disk-shaped scouring tool:

This subclass is indented under subclass 103. Abrading machine employing the flat or plane face of a rotary disk for the purpose of scouring or removing foreign or extraneous material from the work by loose granular abrasive material applied to the disk.

SEE OR SEARCH THIS CLASS, SUBCLASS:

109+, for other rotary tools of this type.

112 Opposed pair of scouring tools:

This subclass is indented under subclass 111. Abrading machine employing the flat or plane faces of opposed rotary disks for the purpose of scouring or removing foreign material from work placed between the disks with the aid of loose granular abrasive material supplied to the disks.

SEE OR SEARCH THIS CLASS, SUBCLASS:

110, 132, 190+, 194, 262+, and 302, for other opposed tools.

113 Immersion:

This subclass is indented under subclass 64. Abrading machine in which the workpiece passes through or otherwise has its whole surface submerged under a mass of loose abrasive material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

74, for a graining box.

104+, for an immersion-type scouring machine.

328, for a drum-type tumbling machine.

114 By use of plural work holders, without tool:
This subclass is indented under subclass 64. Abrading machine including a first work member for supporting a first workpiece and including a second member for supporting a second workpiece, and in which the abrading is accomplished by mutual moving contact of the plural workpieces.

SEE OR SEARCH THIS CLASS, SUBCLASS:
326+, for a tumbling device.

SEE OR SEARCH CLASS:
29, Metal Working, particularly subclasses 90.01+ for burnishing, which may include use of plural work holders, without use of a tool.
125, Stone Working, subclass 27 for millstone dressing.

115 Of valve and seat:
This subclass is indented under subclass 114. Abrading machine in which the abrading is accomplished by mutual moving contact between plural workpieces intended to be used together to contain and adjustably restrict the flow of fluid.

116 Plug cock:
This subclass is indented under subclass 115. Abrading machine by which a plug cock and its seat are abraded to fit by mutual moving contact, with or without an abrasive supply.

SEE OR SEARCH CLASS:
408, Cutting by Use of Rotating Axially Moving Tool, subclass 83.5 for a portable valve refitting device involving the use of a cutting tool that turns about an axis and moves along that axis with respect to a workpiece.
409, Gear Cutting, Milling, or Planing, subclasses 175+ for a portable valve refitting device involving the use of a milling cutter.

117 Poppet valve:
This subclass is indented under subclass 115. Abrading machine by which a poppet valve and its seat are abraded to a fit by mutual moving contact.

SEE OR SEARCH CLASS:
408, Cutting by Use of Rotating Axially Moving Tool, subclass 83.5 for a portable valve refitting device involving the use of a cutting tool that turns about an axis and moves along that axis with respect to a workpiece.
409, Gear Cutting, Milling, or Planing, subclasses 175+ for a portable valve refitting device involving the use of a milling cutter.

118 Slide valve:
This subclass is indented under subclass 115. Abrading machine by which a slide valve and its seat are abraded to a fit by mutual moving contact.

119 Rotary reciprocating tool:
This subclass is indented under subclass 64. Abrading machine using an abrading tool the motion of which can be defined as a first movement about an axis and a second movement to-and-fro along a line.

(1) Note. In this subclass is a machine in which the active face of the tool is not necessarily or distinctively either the peripheral or the radial face and the reciprocation is other than a simple rectilinear or oscillating movement in one plane.

SEE OR SEARCH THIS CLASS, SUBCLASS:
162+, for an abrading machine using a reciprocating tool not having rotary motion.
177+, for an abrading machine using a rotary tool not having reciprocating motion.
421, for a cutting machine knife sharpening attachment which uses a rotary reciprocating abrading tool.
425, for a roll or wheel abrading attachment which uses a rotary reciprocating abrading tool.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing, and General Cleaning, subclass 32 for a boot brushing machine in which the tool has a rotary reciprocating motion.

175, Boring or Penetrating the Earth, subclass 189 for a drive means for an earth boring tool which reciprocates and rotates the tool.

408, Cutting by Use of Rotating Axially Moving Tool, for a drilling machine which feeds the work or tool or both relative to one another along the axis of relative rotation of tool and work; especially, subclass 18 for a machine including a tool of that class type combined with abrasive means to refurbish that tool, subclass 27 for an operation of that class combined with a cutting operation of another class utilizing a crystalline tool, and subclass 145 for a tool operable in that class manner having a crystalline cutting edge.

120 Cylindrical tool:
This subclass is indented under subclass 119. Abrading machine wherein the abrading tool has a work engaging surface coextensive with and parallel to the axis about which it turns.

(1) Note. In this subclass is a machine in which the reciprocation of the abrading tool is other than a simple rectilinear or oscillating movement in one plane.

SEE OR SEARCH THIS CLASS, SUBCLASS:

178, for a machine including a cylindrical abrading tool not having reciprocating motion.

121 Oscillating:
This subclass is indented under subclass 120. Abrading machine wherein the abrading tool moves to-and-fro about an axis.

(1) Note. Including herein is a “rocking” tool (i.e., one which moves to-and-fro about an axis that coincides with the point of engagement of the tool with the workpiece).

SEE OR SEARCH THIS CLASS, SUBCLASS:

163, for an abrading machine including an oscillating tool not having rotary motion about another axis.

122 Harvester knife:
This subclass is indented under subclass 121. Abrading machine especially adapted for sharpening the cutting edge of a member intended to be used in gathering agricultural produce.

SEE OR SEARCH THIS CLASS, SUBCLASS:

128, 225, 230, 235, 349, 372+, and 421, for other inventions related to sharpening an agricultural blade (e.g., a mower or reaper knife).

123 Work rotating:
This subclass is indented under subclass 121. Abrading machine in which the workpiece is caused to turn about an axis.

124 Rectilinear:
This subclass is indented under subclass 120. Abrading machine wherein the abrading tool moves to-and-fro in a straight line.

SEE OR SEARCH THIS CLASS, SUBCLASS:

164, for an abrading machine using a rectilinearly reciprocating tool not having rotary motion.

SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, for the driving mechanism.

125 Pattern and follower driver:
This subclass is indented under subclass 124. Abrading machine wherein the rectilinear motion is actuated by a moving templet and coacting member riding thereon.

126 Blade reversing (e.g., razor blade):
This subclass is indented under subclass 124. Abrading machine particularly adapted to present to the tool, a workpiece comprising a cutting member having a cutting edge in a first position, then turn the member over and present it in a second position for sharpening opposing bevels of the cutting edge.

127 Compound rectilinear motion:
This subclass is indented under subclass 124. Abrading machine using the external peripheral face of a rotary abrading tool which has

also rectilinear reciprocating movements at angles to each other.

SEE OR SEARCH THIS CLASS, SUBCLASS:

166, for an abrading machine using a tool having compound, rectilinear reciprocating motion, but not rotary motion.

128 Harvester knife:

This subclass is indented under subclass 124. Abrading machine especially adapted for sharpening the cutting edge of a member intended to be used in gathering agricultural produce.

SEE OR SEARCH THIS CLASS, SUBCLASS:

122, 225, 230, 235, 349, 372+, and 421, for other inventions related to sharpening an agricultural blade (e.g., a mower or reaper knife).

129 One-way tool cut:

This subclass is indented under subclass 124. Abrading machine wherein the abrading tool functions during its traverse in one direction only, returning idle to the starting point.

130 One-way work traverse:

This subclass is indented under subclass 124. Abrading machine in which the workpiece is carried past the tool for abrading in one direction only.

SEE OR SEARCH THIS CLASS, SUBCLASS:

182+, 260+, and 299+, for other machines having one-way work traverse.

131 Roller work feed:

This subclass is indented under subclass 130. Abrading machine which the workpiece is fed past the grinder in one direction only by feed rollers.

SEE OR SEARCH THIS CLASS, SUBCLASS:

105, 172, 188+, 207+, and 301, for other roller work feeds.

132 Opposed:

This subclass is indented under subclass 124. Abrading machine and having a second rotary rectilinearly reciprocating cylindrical tool arranged to act upon opposite sides of the work simultaneously with or in alternation to the first tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:

110, 112, 190+, 194+, 262+, and 302, for other opposed tools.

133 Reciprocating work holder:

This subclass is indented under subclass 132. Abrading machine in which the workpiece is carried by a work gripping member that moves to-and-fro.

SEE OR SEARCH THIS CLASS, SUBCLASS:

136+, 170+, 199+, 212+, 264+, 272+, 305+, 314+, 320+, and 392+, for other reciprocating work holders.

134 Rotating work holder:

This subclass is indented under subclass 132. Abrading machine in which the workpiece is gripped and turned about an axis while being ground.

SEE OR SEARCH THIS CLASS, SUBCLASS:

106, and see the notes thereto for rotary work holders.

140+, 189, 209+, 218+, 227+, 242+, 268+, 283+, 306, 307+, 317+, 394, and 397+, for other work rotating.

135 Planetary:

This subclass is indented under subclass 124. Abrading machine wherein the tool turns about a first axis passing through its geometrical center, which axis, in turn, turns about a second axis that is outside the tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:

211, and 271, for other tools having planetary motion.

136 Reciprocating work holder:
This subclass is indented under subclass 124. Abrading machine having a workpiece gripping means that moves to-and-fro.

(1) Note. In this subclass are collected those machines in which the reciprocating motion of the work holder is other than simple rectilinear or rocking motion in one plane.

SEE OR SEARCH THIS CLASS, SUBCLASS:
133, 170+, 199+, 212+, 264+, 272+, 305+, 314+, 320+, and 392+, for other reciprocating work holders.

137 Rectilinear:
This subclass is indented under subclass 136. Abrading machine in which the workpiece is moved to-and-fro along a straight line.

138 Rocking:
This subclass is indented under subclass 136. Abrading machine in which the workpiece is turned to-and-fro about an axis that coincides with the point of engagement of the tool with the workpiece.

(1) Note. A rocking workpiece is engaged by the abrading tool in the manner that a rocking chair is engaged by the floor.

SEE OR SEARCH THIS CLASS, SUBCLASS:
171, 201+, 204+, 216+, 226+, 266, 276+, and 396, for other rocking work holders.

139 Swinging tool carrier:
This subclass is indented under subclass 124. Abrading machine in which the tool is mounted in a swinging frame to permit application of the tool to any desired part of the workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:
174+, 236, 280, and 310, for other swinging tool carriers.

SEE OR SEARCH CLASS:
38, Textiles, Ironing or Smoothing, subclass 45 for a rotary and reciprocating ironing roll.
83, Cutting, subclass 490 for a rotatable tool carrier.
144, Woodworking, subclass 103 for a woodworking machine, generally mounted on an overhead pivot, adapted to be freely swung to operative position.

140 Work rotating:
This subclass is indented under subclass 124. Abrading machine in which the workpiece turns about an axis.

(1) Note. In this subclass are collected those machines in which the work is rotated without the use of a rotary work holder.

SEE OR SEARCH THIS CLASS, SUBCLASS:
134, 189, 209+, 218+, 227+, 242+, 268+, 283+, 306, 307+, 317+, 394, and 397+, for other work rotating.

141 Helical blade:
This subclass is indented under subclass 140. Abrading machine specifically adapted for sharpening a cutting member the cutting edge of which is disposed parallel to and along an axis in such a way that the edge extends about the axis as it extends therealong.

142 Cylindrical surface (e.g., roll) abrader:
This subclass is indented under subclass 140. Abrading machine especially adapted for grinding an outwardly facing surface of the shape of a line which rotates about a central axis.

(1) Note. Included herein is grinding of a rotating roll, shaft, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
146, 258, 254+, and 290, for a disk or wheel abrading machine.
348, and 424+, for a wheel or roll grinder.

143 Rotary work holder:
This subclass is indented under subclass 140. Abrading machine including a member which grips and turns the workpiece about an axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:
82+, 106, 173, 210, 246+, 269, 285+, 307+, 324+, and 398+, for other rotary work holders used with an abrading machine.

144 Pattern and follower driver:
This subclass is indented under subclass 143. Abrading machine wherein the rectilinear motion is actuated by a moving templet and coacting member riding thereon.

145 Hydraulic driver:
This subclass is indented under subclass 143. Abrading machine wherein rotary motion is actuated by a fluid motor.

146 Disk or wheel abrader:
This subclass is indented under subclass 143. Abrading machine especially adapted for abrading a rotary platelike member or rolling element.

SEE OR SEARCH THIS CLASS, SUBCLASS:
142, for a roll grinder.
146, 254+, 258, and 290, for a disk or wheel abrading machine.
348, and 424+, for a roll or wheel grinder.

147 Gear abrader:
This subclass is indented under subclass 143. Abrading machine especially adapted for the grinding of a gear.

SEE OR SEARCH THIS CLASS, SUBCLASS:
47, for a gear or worm grinding process.
114+, for apparatus for grinding by mutual contact between two members (e.g., between plural gears).
237+, for a templet guided rotary, periphery face abrading tool.

148 Hob:
This subclass is indented under subclass 147. Abrading machine in which the grinding tool is formed with a helical groove or tooth on its working surface for meshing with and grinding a gear.

149 Turret:
This subclass is indented under subclass 143. Abrading machine in which the workpiece is carried by a rotary table presenting a series of workpieces in succession to the grinder.

SEE OR SEARCH THIS CLASS, SUBCLASS:
247+, 292, and 401, for other abrading machines with a workpiece carrying turret.

SEE OR SEARCH CLASS:
29, Metal Working, subclass 35.5 for a work or tool turret for a combined machine.
74, Machine Element or Mechanism, subclass 813 for an assembly with means to turn a shaft or rotatably mounted device about its axis to one or more selected loci including means to prevent or hold against rotation at such loci.

150 Rectilinearly reciprocating tool carriage:
This subclass is indented under subclass 124. Abrading machine in which the grinding tool is mounted on support structure having to-and-fro motion along a straight line.

151 Hydraulic driver:
This subclass is indented under subclass 150. Abrading machine wherein the reciprocating motion is effected by a fluid motor.

152 Screw and nut driver:
This subclass is indented under subclass 150. Abrading machine wherein the reciprocating motion is effected by relative rotation between coaxial, complimentary threaded members.

153 Flexible driver:
This subclass is indented under subclass 150. Abrading machine in which the reciprocating motion is effected by a pliant element (e.g., by a rope, chain, or cable).

154 Rack and pinion driver:
This subclass is indented under subclass 150. Abrading machine wherein the reciprocating motion is caused by a toothed bar meshed with a gear.

155 Reciprocating spindle:
This subclass is indented under subclass 124. Abrading machine wherein the rotary tool is supported by a spindle which also moves in a back and forth linear motion along its axis.

156 Hydraulic driver:
This subclass is indented under subclass 155. Abrading machine wherein the reciprocating motion is effected by a fluid motor.

157 Cam and follower driver:
This subclass is indented under subclass 155. Abrading machine wherein the reciprocating motion is effected by interengagement of a rotating member having an eccentric surface with a member which engages and conforms to the movement of that surface.

158 Disk tool:
This subclass is indented under subclass 119. Abrading machine wherein the abrading tool has a radial or flat face normal to the axis about which it turns.

(1) Note. In this subclass are collected patents in which the reciprocating motion of the tool is other than a simple rectilinear or rocking reciprocation in a single plane.

SEE OR SEARCH THIS CLASS, SUBCLASS:
158+, 259+, 353, 359, and 548+, for other rotary abrading disk tools.

SEE OR SEARCH CLASS:
409, Gear Cutting, Milling, or Planing, subclasses 64+ for milling generally and subclasses 288+ for planing generally.

159 Oscillating:
This subclass is indented under subclass 158. Abrading machine wherein the abrading tool moves to-and-fro about an axis.

(1) Note. Including herein is a “rocking” tool (i.e., one which moves to-and-fro about an axis that coincides with the point of engagement of the tool with the workpiece).

160 Rectilinear:
This subclass is indented under subclass 158. Abrading machine wherein the rotary abrading tool has to-and-fro movement along a straight line, in one plane.

161 Gear abrader:
This subclass is indented under subclass 160. Abrading machine specifically disclosed for finishing a gear.

162 Reciprocating tool:
This subclass is indented under subclass 64. Abrading machine in which the abrading tool has a to-and-fro abrading movement.

(1) Note. In this subclass are collected machines in which the tool has other than a simple oscillation in one plane or a simple or compound rectilinear reciprocating movement in one plane.

SEE OR SEARCH THIS CLASS, SUBCLASS:
108, for a reciprocating tool scouring device.
119+, for a rotary reciprocating tool machine.
351, for a portable grinding machine with a reciprocating tool.
426+, for a reciprocating tool, roll, or wheel grinding attachment.

SEE OR SEARCH CLASS:
12, Boot and Shoe Making, subclass 78 for a reciprocating tool machine for burnishing boots or shoes.
15, Brushing, Scrubbing, and General Cleaning, subclass 33 and 37 for a reciprocating brush machine for cleaning or polishing boots.
29, Metal Working, subclass 90.3 for burnishing paper with a heated reciprocating tool.
38, Textiles: Ironing or Smoothing, for a reciprocating ironing tool or machine.

175, Boring or Penetrating the Earth, subclass 189 and the search there noted for a drive means for an earth boring tool which reciprocates the tool.

241, Solid Material Comminution or Disintegration, subclass 283 for a comminuting machine having a reciprocating comminuting surface.

163 Oscillating:

This subclass is indented under subclass 162. Machine in which the abrading tool moves to-and-fro about an axis, in one plane during abrading.

(1) Note. Including herein is a "rocking" tool (i.e., one which moves to-and-fro about an axis that coincides with the point of engagement of the tool with the workpiece).

SEE OR SEARCH THIS CLASS, SUBCLASS:

121+, for an abrading machine which uses a rotary-oscillating tool.

164 Rectilinear:

This subclass is indented under subclass 162. Abrading machine in which the abrading tool moves to-and-fro along a straight line in one plane during abrading.

165 Ultrasonic:

This subclass is indented under subclass 164. Abrading machine wherein the grinding tool is vibrated at a frequency higher than that heard by the human ear (i.e., above about 20,000 cycles per second).

166 Compound rectilinear motion:

This subclass is indented under subclass 164. Abrading machine in which a tool having only rectilinearly-reciprocating movements has some of such movements at an angle to each other in one plane.

SEE OR SEARCH THIS CLASS, SUBCLASS:

127, for a machine having a rotary tool also having a compound reciprocating motion.

167 Endless work carrier:

This subclass is indented under subclass 164. Abrading machine operating on work presented by a band-type work advancing means.

SEE OR SEARCH THIS CLASS, SUBCLASS:

184+, and 300, for other endless work carriers.

168 Flexible strip or endless band tool:

This subclass is indented under subclass 164. Abrading machine in which the tool is a flexible or yielding end-supported strip or band in distinction from a pad or cushion.

SEE OR SEARCH THIS CLASS, SUBCLASS:

296+, especially 313+, for other flexible tools.

169 Stropping machine:

This subclass is indented under subclass 168. Abrading machine especially organized and adapted for stropping a razor.

SEE OR SEARCH THIS CLASS, SUBCLASS:

316, and 318, for other strops.

459, for a strop surface renewing device.

SEE OR SEARCH CLASS:

30, Cutlery, subclasses 35+, for a razor combined with means to facilitate sharpening or for a device to facilitate sharpening a razor, per se, if features are claimed restricting the device to use with a razor, such as means for securing the blade in operative relation to a gauge or guard that protects the skin from cuts.

170 Reciprocating work holder:

This subclass is indented under subclass 164. Abrading machine in which the work holder also has to-and-fro movement.

SEE OR SEARCH THIS CLASS, SUBCLASS:

133, 136+, 199+, 212+, 264+, 272+, 305+, 314+, 320+, and 392+, for other reciprocating work holders.

171 Rocking:

This subclass is indented under subclass 170. Abrading machine in which the work holder turns to-and-fro about an axis that coincides with the point of engagement of the tool with the workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:

138, 201+, 204+, 216+, 226+, 266, 276+, and 396, for other rocking work holders.

172 Roller work feed:

This subclass is indented under subclass 164. Abrading machine in which the work is presented by feed rollers.

SEE OR SEARCH THIS CLASS, SUBCLASS:

105, 131, 188+, 207+, and 301, for other roller work feeds.

173 Rotary work holder:

This subclass is indented under subclass 164. Abrading machine including a member which grips and turns the workpiece about an axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:

82+, 106, 143+, 210, 246+, 269, 285+, 307+, 324+, and 398+, for other rotary work holders used with an abrading machine.

174 Swinging tool carrier:

This subclass is indented under subclass 164. Abrading machine in which the tool is so mounted as to be capable of swinging to the desired point of application to the work.

SEE OR SEARCH THIS CLASS, SUBCLASS:

139, 236, 280, and 310, for other swinging tool carriers.

SEE OR SEARCH CLASS:

83, Cutting, subclass 490 for a swinging-saw mount.

144, Woodworking, subclass 103 for a woodworking machine, generally mounted on an overhead pivot, adapted to be freely swung to operative position.

175 Having actuating handle:

This subclass is indented under subclass 174. Abrading machine in which the tool is reciprocated for grinding by the hand of the operator with a simple rectilinear motion in one plane and is mounted in a swinging carrier.

176 Drawing reel:

This subclass is indented under subclass 164. Abrading machine in which the workpiece is a continuous length of wire or the like traversed past the tool by a winding-drum.

SEE OR SEARCH THIS CLASS, SUBCLASS:

107, and 183, for other work feeds of this type.

177 Rotary tool:

This subclass is indented under subclass 64. Abrading machine using an abrading instrumentality that turns about an axis more than 360° during operation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

109+, and 111+, for a scouring machine which uses a rotary tool.

119+, for an abrading machine using a rotary reciprocating tool.

296+, for an abrading machine using an endless band tool.

344+, for a frame or mount for a portable machine which may use a rotary tool.

420+, for an attachment to a machine which uses a rotary abrading tool to sharpen a knife thereof.

SEE OR SEARCH CLASS:

12, Boot and Shoe Making, subclass 77 for a rotary tool machine for burnishing boots or shoes.

15, Brushing, Scrubbing, and General Cleaning, subclass 34 for a rotary brush machine for cleaning, blacking, or polishing boots.

144, Woodworking, subclasses 28.1+ for a pencil-sharpening machine in which an abrasive tool and support structure therefor are in rotary relation to a work holder or work guide; and sub-

classes 28.1 and 28.9 in which the tool is nonrotary (stationary in subclass 28.1, reciprocal or oscillatory in subclass 28.9) and the work holder is rotated relative thereto.

241, Solid Material Comminution or Disintegration, subclasses 277+ for a rotating comminuting surface.

408, Cutting by Use of Rotating Axially Moving Tool, appropriate subclasses for a drilling machine which feed the tool or work or both relative to one another along the axis of relative rotation of tool and work.

409, Gear Cutting, Milling, or Planing, subclasses 64+, Milling, especially subclasses 138, 139, and 140 for a machine having means to trim edge and to remove scale, raised surface imperfection, flash, or burr.

178 Rotary cylinder:

This subclass is indented under subclass 177. Abrading machine in which abrading is accomplished using the axially extending peripheral face of the rotary tool.

(1) Note. The face of the abrading tool is substantially parallel to the axis of rotation.

(2) Note. A device including a tool face not clearly radial is included herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

109+, for a scouring machine that uses a rotary cylinder-type scouring tool.

120+, for an abrading machine that uses a rotary reciprocating tool.

352, for a frame or mount for a portable machine using a rotary cylinder abrading tool.

541+, for a rotary rigid cylindrical tool.

SEE OR SEARCH CLASS:

144, Woodworking, subclass 28.11 and 28.6+ for a pencil-sharpening machine in which a peripheral-face abrasive tool is in rotary relation to a work holder or work guide; and subclass 28.9, in which the support structure for the tool is stationary, relative to supporting structure for the machine, and the work holder is rotary, relative thereto.

409, Gear Cutting, Milling, or Planing, subclasses 64+ for a milling machine or for a machine disclosed as being for use with either a milling tool or an abrading tool.

179 Linear indexing of the tool:

This subclass is indented under subclass 178. Abrading machine in which the tool is moved to a succession of different positions with regular incremental movements relative to a linear dimension of a workpiece.

180 Internal:

This subclass is indented under subclass 178. Abrading machine in which the abrading is done by the radially inwardly facing peripheral face.

SEE OR SEARCH CLASS:

144, Woodworking, subclasses 49+ for a miscellaneous single operation machine.

409, Gear Cutting, Milling, or Planing, subclass 143 for a milling machine having means for internal milling.

181 Abrading crank-pin:

This subclass is indented under subclass 180. Abrading machine especially adapted to grind a journal bearing for receiving a crankshaft.

182 One-way work traverse:

This subclass is indented under subclass 178. Abrading machine in which the workpiece is carried past the tool in one direction only.

SEE OR SEARCH THIS CLASS, SUBCLASS:

130+, 260, 261, and 299+, for other machines having one-way work traverse.

183 Drawing reel:

This subclass is indented under subclass 182. Abrading machine having a winding member on which the work is wound that turns about an axis and pulls the work rectilinearly in one direction across the tool

SEE OR SEARCH THIS CLASS, SUBCLASS:

105, and 176, for other work feeds of this type.

SEE OR SEARCH CLASS:

140, Wireworking, subclass 1 for a combined machine and subclass 139 for a wire cutting and straightening machine having a work feed of this type.

242, Winding, Tensioning, or Guiding, for a miscellaneous winding or reeling device.

184 Endless work carrier:

This subclass is indented under subclass 182. Abrading machine having a moving conveyor which carries a workpiece rectilinearly in one direction only past the rotary abrading tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:

167, for other endless work carriers.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, for an endless conveyor, per se.

185 Blade sharpener:

This subclass is indented under subclass 184. Abrading machine especially adapted to sharpen the edge of a cutting member.

186 Nut and screw:

This subclass is indented under subclass 182. Abrading machine in which the workpiece is fed past the tool by the relative rotation of elements having a helical groove cut into their surfaces.

SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, subclass 424.8 for miscellaneous screw and nut gearing.

187 Blade sharpener:

This subclass is indented under subclass 186. Abrading machine especially adapted to sharpen the edge of a cutting member.

188 Roller work feed:

This subclass is indented under subclass 182. Abrading machine in which the workpiece is fed past the tool by feed-rollers.

SEE OR SEARCH THIS CLASS, SUBCLASS:

105, 131, 172, 207, and 301, for other roller work feeds.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclass 604, 608, 611+, 624, and 780+ for a conveyor, per se, having power-driven roll(s).

189 Work rotating:

This subclass is indented under subclass 188. Abrading machine in which the workpiece is turned about an axis, generally by the feed rollers themselves, while being fed past the tool in one direction only.

SEE OR SEARCH THIS CLASS, SUBCLASS:

134, 140, 209+, 218+, 227+, 242+, 268+, 274, 283+, 306, 307+, 317+, 379, 385, 394, and 397+, for other work rotating.

SEE OR SEARCH CLASS:

414, Material or Article Handling, subclasses 431+ for apparatus for advancing and rotating an elongated article by means adapted to engage the article between its ends.

190 Opposed abrading tools:

This subclass is indented under subclass 182. Abrading machine in which a plurality of grinding tools are located on opposite or different sides of the workpiece and simultaneously or successively treat such opposite or different sides thereof.

191 Razor blade:

This subclass is indented under subclass 190. Abrading machine in which the work member is intended to shave.

192 Blade sharpener:
This subclass is indented under subclass 190. Abrading machine especially adapted to sharpen the edge of a cutting member.

193 Blade sharpener:
This subclass is indented under subclass 182. Abrading machine especially adapted to sharpen the edge of a cutting member.

194 Opposed abrading tools:
This subclass is indented under subclass 178. Abrading machine in which a plurality of grinding tools are located on opposite or different sides of the workpiece and simultaneously or successively treat such opposite or different sides thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:
132+, 262+, and 302, for other opposed tools.

SEE OR SEARCH CLASS:
76, Metal Tools and Implements, Making, subclass 50 for a machine having a rotary cutting or abrading device for truing the points or sides of the teeth of a saw blade.

195 Alternating tools:
This subclass is indented under subclass 194. Abrading machine in which abrading tools act in alternation upon a relatively stationary workpiece.

196 Blade sharpener:
This subclass is indented under subclass 195. Abrading machine especially adapted to sharpen the edge of a cutting member.

197 Plunger infeeder:
This subclass is indented under subclass 194. Abrading machine in which the work is fed between the tools by a reciprocating pushing device.

198 Blade sharpener:
This subclass is indented under subclass 197. Abrading machine especially adapted to sharpen the edge of a cutting member.

199 Reciprocating work holder:
This subclass is indented under subclass 194. Abrading machine having a member which carries the workpiece in an alternating back-and-forth movement.

(1) Note. This subclass includes a device in which the work holder has a motion other than a rectilinear reciprocation in one plane, a simple rocking reciprocation, or such a reciprocation combined with a rocking movement.

SEE OR SEARCH THIS CLASS, SUBCLASS:
133, 136+, 170+, 199+, 212+, 264+, 272+, 305+, 314+, 320+, and 389+, for other reciprocating work holders.

200 Rectilinear:
This subclass is indented under subclass 199. Abrading machine in which the work holder back-and-forth movement is in a straight line.

201 Rocking:
This subclass is indented under subclass 200. Abrading machine in which the work holder moves to-and-fro about an axis that coincides with the point of engagement of the abrading tool and the workpiece and the tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:
138, 171, 204+, 216+, 226+, 266, 276+, and 396, for other rocking work holders.

202 Blade sharpener:
This subclass is indented under subclass 201. Abrading machine especially adapted to sharpen the edge of a cutting member.

203 Blade sharpener:
This subclass is indented under subclass 200. Abrading machine especially adapted to sharpen the edge of a cutting member.

204 Rocking:
This subclass is indented under subclass 199. Abrading machine in which the work holder moves to-and-fro about an axis that coincides with the point of engagement of the abrading tool and the workpiece and the tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:

138, 171, 201, 216, 226+, 266, and 276+, for other machines having rocking work holders.

205 Blade sharpener:
This subclass is indented under subclass 204. Abrading machine especially adapted to sharpen the edge of a cutting member.

206 Blade sharpener:
This subclass is indented under subclass 199. Abrading machine especially adapted to sharpen the edge of a cutting member.

207 Roller work feed:
This subclass is indented under subclass 194. Abrading machine in which the workpiece is forwarded between the abrading tools by feed-rollers.

SEE OR SEARCH THIS CLASS, SUBCLASS:

105, 131, 172, 188, and 301, for other roller work feeds.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclass 604, 608, 611+, 624, and 780+, for a conveyor, per se, having power-driven rollers.

208 Blade sharpener:
This subclass is indented under subclass 207. Abrading machine especially adapted to sharpen the edge of a cutting member.

209 Work rotating:
This subclass is indented under subclass 194. Abrading machine in which the workpiece turns about an axis.

(1) Note. In this subclass are collected those machines in which the workpiece rotates without the use of a rotary work holder.

SEE OR SEARCH THIS CLASS, SUBCLASS:

134, 140, 189, 218+, 227+, 242+, 268+, 283+, 306, 307+, 317+, 394, and 397+, for other work rotating.

210 Rotary work holder:
This subclass is indented under subclass 209. Abrading machine in which the workpiece is secured to a rotary drive element for support and rotation therewith.

SEE OR SEARCH THIS CLASS, SUBCLASS:

82+, 106, 143+, 173, 246+, 269, 285+, 307+, 324+, and 398+, for other rotary work holders used with an abrading machine.

211 Planetary:
This subclass is indented under subclass 178. Abrading machine in which the abrading tool is mounted for bodily movement in an orbit, as well as for rotation on its own axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:

135, and 271, for other tools having planetary motion.

SEE OR SEARCH CLASS:

409, Gear Cutting, Milling, or Planing, subclass 122 wherein the cutting tool is supported for rotation about its axis and for relative arcuate translatory movement about the circumference of the workpiece.

212 Reciprocating work holder:
This subclass is indented under subclass 178. Abrading machine having means to carry the workpiece in an alternating back-and-forth movement.

(1) Note. The reciprocating movement of the work holder in this subclass is other than a simple or compound rectilinear movement in a single plane, such a movement combined with a rocking or rotary movement, a simple rocking movement, or such movement combined with a rotary movement.

SEE OR SEARCH THIS CLASS, SUBCLASS:

133, 136+, 170+, 199+, 264+, 272+, 305+, 314+, 320+, and 230+, for other reciprocating work holders.

213 Rectilinear:
This subclass is indented under subclass 212. Abrading machine in which the work holder movement is in a straight line.

214 Indexing:
This subclass is indented under subclass 213. Abrading machine which is adapted to hold a workpiece in a succession of different positions with regular incremental movements relative to the abrading surface.

SEE OR SEARCH CLASS:
409, Gear Cutting, Milling, or Planing, subclass 198 for an indexable work holder which feeds a rotary cutter toward the workpiece and subclass 221 for an indexable work supporting structure.

215 Compound:
This subclass is indented under subclass 213. Abrading machine in which the work holder straight line movement is in two or more directions at an angle to one another.

216 Rocking:
This subclass is indented under subclass 213. Abrading machine in which the work holder moves to-and-fro about an axis that coincides with the point of engagement of the abrading tool and the workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:
138, 171, 201, 204, 226+, 266, and 276+, for other rocking work holders.

217 Hob, tap, or fluted thread:
This subclass is indented under subclass 216. Abrading machine which grinds teeth, grooves, or threads.

SEE OR SEARCH CLASS:
409, Gear Cutting, Milling, or Planing, subclass 11 and 12 for apparatus for or method of hobbing.

218 Work rotating:
This subclass is indented under subclass 213. Abrading machine in which the workpiece is turned about an axis while being reciprocated.

SEE OR SEARCH THIS CLASS, SUBCLASS:
134, 140, 189, 209+, 227+, 242+, 268+, 283+, 306, 307+, 317+, 394, and 397+, for other work rotating.
274, and 306, for other combined work rotating and reciprocating.

SEE OR SEARCH CLASS:
409, Gear Cutting, Milling, or Planing, subclasses 65+ for thread or helix generating.

219 Gear forming:
This subclass is indented under subclass 218. Abrading machine which grinds a workpiece to form a gear.

(1) Note. Hobbing by use of an abrading tool is included herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:
147+, 253, and 275, for other gear grinders with a reciprocating or rotating work holder.

SEE OR SEARCH CLASS:
409, Gear Cutting, Milling, or Planing, subclasses 65+ for thread or helix generating.

220 Long helix:
This subclass is indented under subclass 218. Abrading machine which grinds a helical form on a workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:
222+, for abrading a comparatively short helix on a workpiece to form a thread therein.

SEE OR SEARCH CLASS:
409, Gear Cutting, Milling, or Planing, subclasses 65+ for thread or helix generating.

221 Rotary work holder:
This subclass is indented under subclass 218. Abrading machine including a rotary workpiece gripping means for rotating with the work during the abrading operation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

82+, 106, 143+, 173, 210, 246+, 269, 285+, 307, 324, and 398+, for other rotary work holders used with an abrading machine.

222 Thread abrader:

This subclass is indented under subclass 218. Abrading machine which grinds a helical groove in a workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:

220, for an abrading means for forming a long helix on a workpiece.

SEE OR SEARCH CLASS:

409, Gear Cutting, Milling, or Planing, subclasses 65+ for thread or helix generating.

223 Including work support engaging work at opposite, axial ends (e.g., opposed "centers"):

This subclass is indented under subclass 222. Abrading machine having a pair of members intended to contact an elongated, generally rodlike workpiece at both ends to support the workpiece while allowing the workpiece to rotate with respect to the abrading tool.

224 Blade sharpener:

This subclass is indented under subclass 213. Abrading machine especially adapted to sharpen the edge of a cutting member.

SEE OR SEARCH THIS CLASS, SUBCLASS:

202, 203, 206, and 367+, for other reciprocating blade holders.

225 Harvester knife:

This subclass is indented under subclass 213. Abrading machine especially adapted for sharpening the cutting edge of a member intended to be used in gathering agricultural produce.

SEE OR SEARCH THIS CLASS, SUBCLASS:

122, 128, 230, 235, 349, 372+, and 421, for other inventions related to sharpening an agricultural blade (e.g., a mower or reaper knife).

226 Rocking:

This subclass is indented under subclass 212. Abrading machine in which the work holder moves to-and-fro about an axis that coincides with the point of engagement of the abrading tool and the workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:

138, 171, 201, 204, 216, 266, and 276, for other machines with a rocking work holder.

227 Work rotating:

This subclass is indented under subclass 226. Abrading machine in which the rocking workpiece is turned about an axis while being abraded.

SEE OR SEARCH THIS CLASS, SUBCLASS:

123, 218, 274, and 306, for other combined work rotating and reciprocating.

134, 140, 189, 209+, 218+, 242+, 268+, 283+, 306, 307+, 317+, 394, and 397+, for other work rotating.

SEE OR SEARCH CLASS:

409, Gear Cutting, Milling, and Planing, subclass 76 for means to rotate a workpiece and means to interrelatedly infeed the work relative to the tool.

228 Noncircular cross section:

This subclass is indented under subclass 227. Abrading machine in which the workpiece has a noncircular cross section, for example a cam or lobed surface.

229 Blade sharpener:

This subclass is indented under subclass 212. Abrading machine especially adapted to sharpen the edge of a cutting member.

SEE OR SEARCH THIS CLASS, SUBCLASS:

202, 203, 206, 367+, and 392+, for other reciprocating blade holders.

230 Harvester knife:
This subclass is indented under subclass 212. Abrading machine especially adapted for sharpening the cutting edge of a member intended to be used in gathering agricultural produce.

SEE OR SEARCH THIS CLASS, SUBCLASS:
122, 128, 225, 235, 349, 372+, and 421+ for other inventions related to sharpening an agricultural blade (e.g., mower or reaper knife).

231 Stationary work holder:
This subclass is indented under subclass 178. Abrading machine in which the workpiece is supported by a member which does not move during the abrading.

(1) Note. The work position may be changed before or after abrading engagement.

232 Reversing, obverting, or pivoting:
This subclass is indented under subclass 231. Abrading machine in which the work holder provides for a plurality of work positions by an end for end, edge for edge, or angular swing of the work holder.

(1) Note. Included here is a device for sharpening a single edge or double-edged razor blade.

SEE OR SEARCH THIS CLASS, SUBCLASS:
279, for a similar work holder in combination with a radial face tool.

233 Spaced portions:
This subclass is indented under subclass 231. Abrading machine for grinding at least two distinct remote locations on a workpiece.

234 Blade sharpener:
This subclass is indented under subclass 231. Abrading machine especially adapted to sharpen the edge of a cutting member.

SEE OR SEARCH THIS CLASS, SUBCLASS:
126, 278+, and 364+, for other knife grinders or stationary blade holders.

235 Harvester knife:
This subclass is indented under subclass 231. Abrading machine especially adapted for sharpening the cutting edge of a member intended to be used in gathering agricultural produce.

SEE OR SEARCH THIS CLASS, SUBCLASS:
122, 128, 225, 230, 349, 372+ and 421 for other inventions related to sharpening an agricultural blade (e.g., a mower or reaper knife).

236 Swinging tool carrier:
This subclass is indented under subclass 178. Abrading machine in which the abrading tool is mounted in a swinging frame to permit application of the tool to any desired part of the work.

SEE OR SEARCH THIS CLASS, SUBCLASS:
139, 174, 280, and 310, for other swinging tool carriers.

SEE OR SEARCH CLASS:
83, Cutting, subclass 490 for a tool carrier for a rotatable tool, which carrier is oscillated or rotated.
144, Woodworking, subclass 103 for a woodworking machine, generally mounted on an overhead pivot, adapted to be freely swung to operative position.
409, Gear Cutting, Milling, or Planing, subclasses 64+, Milling, particularly subclasses 183+ for means to infeed a rotary cutter toward a workpiece.

237 Templet:
This subclass is indented under subclass 178. Abrading machine in which the abrading of the workpiece is under the control of a pattern and a follower.

SEE OR SEARCH THIS CLASS, SUBCLASS:

125, and 281, for other template combinations.

SEE OR SEARCH CLASS:

144, Woodworking, subclasses 134.1+ for shaping of wood.

409, Gear Cutting, Milling, or Planing, subclasses 64+, Milling, particularly subclasses 67 and 130 having means to regulate operation by use of a templet.

238 Pantograph:

This subclass is indented under subclass 237. Abrading machine wherein the templet is traced by an articulated parallelogram linkage which proportionally directs the motion of the abrading tool.

SEE OR SEARCH CLASS:

409, Gear Cutting, Milling, or Planing, subclasses 86+ for other pantograph combinations.

239 Rotary templet or pattern:

This subclass is indented under subclass 237. Abrading machine wherein the pattern is rotated.

240 Lens abrader:

This subclass is indented under subclass 239. Abrading machine wherein the rotary templet is specifically disclosed for grinding an optical device made from glass, plastic, or other transparent material.

(1) Note. This subclass takes a device for lens surface polishing as well as one for lens generating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

42, for a method of grinding a lens.

255, 256, 277, and 323, for other lens grinders.

241 Work guide:

This subclass is indented under subclass 178. Abrading machine including a member or rest to facilitate the application of the work to the tool at the proper angle.

SEE OR SEARCH THIS CLASS, SUBCLASS:

267, and 282, for other work guides.

SEE OR SEARCH CLASS:

144, Woodworking, subclasses 253.1+ for a work guide.

409, Gear Cutting, Milling, or Planing, subclass 205 and 225 for a work holder or guide.

242 Work rotating:

This subclass is indented under subclass 178. Abrading machine in which the work is turned about an axis while being abraded.

(1) Note. This subclass includes a machine in which a workpiece is other than a disk or wheel and is merely rotated, without the use of a specific rotary work holder.

SEE OR SEARCH THIS CLASS, SUBCLASS:

134, 140, 189, 209+, 218+, 227+, 268+, 283+, 306, 307+, 317+, 394, and 397+, for other work rotating.

243 With “dead” center:

This subclass is indented under subclass 242. Abrading machine in which the workpiece is slidingly supported for rotation by a nonrotating member at surface of the workpiece that coincides with the axis about which the workpiece rotates during abrading.

(1) Note. Opposed “dead” centers are included in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

397+, for a work holder for an abrading machine having centers which support the workpiece for rotation.

244 Work handling:

This subclass is indented under subclass 242. Abrading machine wherein the work is loaded into a grinding position, supported for rotation while in contact with the abrading tool, and then unloaded.

(1) Note. This subclass includes patents for centerless grinders wherein the workpiece location is fixed during abrading.

245 Through feed:
This subclass is indented under subclass 242. Abrading machine in which the work is traversed axially past the abrading tool in one direction during the abrading process.

(1) Note. This subclass includes patents disclosing centerless grinding machines having a regulating wheel opposite the grinder for rotating and traversing the work past the grinder.

246 Rotary work holder:
This subclass is indented under subclass 242. Abrading machine including a member adapted to grip and turn with the work about an axis more than 360°.

SEE OR SEARCH THIS CLASS, SUBCLASS:
82+, 106, 143+, 173, 210, 246+, 269, 285+, 307+, 324+, and 398+, for other rotary work holders used with an abrading machine.

247 Turret:
This subclass is indented under subclass 246. Abrading machine including a rotating table which brings a number of workpieces in succession to the abrading tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:
149, 292, 308, and 401, for other turrets.

SEE OR SEARCH CLASS:
29, Metal Working, subclasses 35.5+ for plural diverse manufacturing apparatus including a work or tool turret.
74, Machine Element or Mechanism, subclasses 813+ for a rotary member or shaft with means to index the rotary member or shaft about its axis to one or more selected loci including means to prevent or hold against rotation at such loci.

248 Blade sharpener:
This subclass is indented under subclass 247. Abrading machine especially adapted to sharpen the edge of a cutting member.

249 Spaced abrading areas:
This subclass is indented under subclass 246. Abrading machine in which the workpiece is abraded in at least two distinct locations.

SEE OR SEARCH THIS CLASS, SUBCLASS:
233+, 397+, and 399, for an abrading process involving plural distinct abrading areas on the workpiece.

250 By hob:
This subclass is indented under subclass 246. Abrading machine in which the grinding tool is formed with a helical groove or tooth on its working surface for meshing with and grinding a gear.

251 Abrading eccentric shape:
This subclass is indented under subclass 246. Abrading machine having means to infeed either the workpiece or the grinding tool as the workpiece is rotated in order to grind a lobed surface.

252 Valve abrader:
This subclass is indented under subclass 246. Abrading machine particularly adapted to grind a sealing surface of a member intended to be used to contain and adjustably restrict the flow of fluid.

253 Gear abrader:
This subclass is indented under subclass 246. Abrading machine specifically disclosed for finishing a gear by meshing with a toothed grinding tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:
250, for abrading a gear by use of a hob.

254 Disk or wheel abrader:
This subclass is indented under subclass 246. Abrading machine especially adapted for the grinding of a flat, circular plate or circular ring.

SEE OR SEARCH THIS CLASS, SUBCLASS:

142, for a roll grinder.
146, 258, and 290, for a disk or wheel abrading machine.
348, and 424+, for a roll or wheel grinder.

255 Lens abrader:

This subclass is indented under subclass 254. Abrading machine specifically disclosed for grinding an optical device made from glass, plastic, or other transparent material.

(1) Note. This subclass takes a device for lens surface polishing as well as one for lens generating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

42, for a method of grinding a lens.
240, 256, 277, and 323, for other lens grinders.

256 Lens abrader:

This subclass is indented under subclass 246. Abrading machine specifically disclosed for grinding an optical device made from glass, plastic, or other transparent material.

(1) Note. This subclass takes a device for lens surface polishing as well as one for lens generating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

42, for a method of grinding a lens.
240, 255, 277, and 323, for other lens grinders.

257 Glassware ornamenting:

This subclass is indented under subclass 246. Abrading machine especially adapted for producing a decorative pattern on an article made of glass.

(1) Note. Included herein is means to produce so-called “cut-glass.”

258 Disk or wheel abrader:

This subclass is indented under subclass 242. Abrading machine especially adapted for grinding a flat, circular plate or circular ring.

SEE OR SEARCH THIS CLASS, SUBCLASS:

142, for a roll grinder.
146, 254+, and 290, for a disk or wheel abrading machine.
348, and 424+, for a roll or wheel grinder.

259 Rotary disk:

This subclass is indented under subclass 177. Abrading machine in which the abrading is done by a rigid tool, including a circular, planar surface, which tool is intended to turn about an axis normal to and passing through that surface to abrade the work by that surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:

111+, 158+, and 548+, for other rotary radial face tools.
353, for a portable floor grinding machine with a disk tool.

260 One-way work traverse:

This subclass is indented under subclass 259. Abrading machine in which the workpiece is traversed past the tool in one direction only.

SEE OR SEARCH THIS CLASS, SUBCLASS:

130+, 182+, 261, and 299+, for other machines having one-way work traverse.

261 Opposed abrading tools:

This subclass is indented under subclass 260. Abrading machine having a plurality of abrading tools located on opposite or different sides of the workpiece which simultaneously or successively treat such opposite or different sides thereof.

262 Opposed abrading:

This subclass is indented under subclass 259. Abrading machine having a plurality of abrading tools located on opposite or different sides of the workpiece which simultaneously or successively treat such opposite or different sides thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

110, 132+, 158, 194+, 261, and 302, for other opposed tools.

263 Blade reversing:
This subclass is indented under subclass 262. Abrading machine particularly adapted for sharpening opposed bevel surfaces of a blade edge wherein each of the opposed abrading tools operates on a respective bevel.

264 Reciprocating work holder:
This subclass is indented under subclass 262. Abrading machine having means to carry the workpiece alternatingly back-and-forth during abrading.

(1) Note. This subclass includes a machine in which the reciprocating work holder has motion other than a simple rectilinear one or a simple oscillation or rocking.

SEE OR SEARCH THIS CLASS, SUBCLASS:
133+, 136+, 170+, 199+, 212+, 272+, 305+, 314+, and 320+, for other reciprocating work holders.

SEE OR SEARCH CLASS:
409, Gear Cutting, Milling, or Planing, subclass 162 for means to reciprocate or oscillate work.

265 Rectilinear:
This subclass is indented under subclass 264. Abrading machine in which the work holder reciprocation is in a straight line.

266 Rocking:
This subclass is indented under subclass 264. Abrading machine in which the work holder moves to-and-fro about an axis that coincides with the point of engagement of the abrading tool and the workpiece.

(1) Note. A rocking workpiece is engaged by the abrading tool in the manner that a rocking chair is engaged by the floor.

SEE OR SEARCH THIS CLASS, SUBCLASS:
138, 201+, 204+, 216+, 226+, 276+, and 396, for other rocking work holders.

SEE OR SEARCH CLASS:
409, Gear Cutting, Milling, or Planing, subclass 162 for means to reciprocate or oscillate work.

267 Work guide:
This subclass is indented under subclass 262. Abrading machine including a member or rest which facilitates the application of the workpiece to the tool at a proper angle.

SEE OR SEARCH THIS CLASS, SUBCLASS:
241, 282, 545, 549, and 555, for other work guides.

SEE OR SEARCH CLASS:
144, Woodworking, subclasses 253.1+ for a work guide to be used with a machine of that class.
409, Gear Cutting, Milling, or Planing, subclass 205 and 225 for a work holder or guide.

268 Work rotating:
This subclass is indented under subclass 262. Abrading machine in which the workpiece is turned about an axis while being abraded.

SEE OR SEARCH THIS CLASS, SUBCLASS:
134, 140+, 189, 209+, 218+, 227+, 242+, 283+, 306, 307+, 317+, 394, and 397+, for other work rotating.

269 Rotary work holder:
This subclass is indented under subclass 268. Abrading machine in which the workpiece is mounted in or on a member which turns about an axis during abrading of the workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:
82+, 106, 143+, 173, 210, 246+, 285+, 307+, 324+, and 398+, for other rotary work holders used with an abrading machine.

270 Orbital:
This subclass is indented under subclass 259. Abrading machine in which the tool rotates about an axis which is eccentric to the geometric tool center axis.

(1) Note. The tool rotation is about an axis other than the geometrical center of the tool which results in the center of the tool being revolved in an orbit.

SEE OR SEARCH CLASS:
408, Cutting by Use of Rotating Axially Moving Tool, subclass 47 wherein at least one tool is driven by an orbiting wrist plate.

271 Planetary:
This subclass is indented under subclass 270. Abrading machine in which the tool revolves about an axis within itself and also about an axis outside itself, so as to follow a planetary path.

SEE OR SEARCH THIS CLASS, SUBCLASS:
135, 211, 437, and 440, for other tools having planetary motion.

272 Reciprocating work holder:
This subclass is indented under subclass 259. Abrading machine having means to carry the workpiece in an alternating back-and-forth movement.

(1) Note. This subclass includes a machine in which the work holder has a reciprocation other than a simple rectilinear one, such motion combined with work rotating, or a simple rocking or oscillation.

SEE OR SEARCH THIS CLASS, SUBCLASS:
133, 136+, 170+, 199+, 212+, 264+, 305+, 314+, 320+, and 392+, for other reciprocating work holders.

SEE OR SEARCH CLASS:
409, Gear Cutting, Milling, or Planing, subclass 162 for reciprocating or oscillating means to infeed work to the cutter.

273 Rectilinear:
This subclass is indented under subclass 272. Abrading machine using the radial face of an abrading tool having rotary motion only and a work holder having simple rectilinear reciprocation.

274 Work rotating:
This subclass is indented under subclass 273. Abrading machine in which the work is rotated during reciprocation of the work holder.

SEE OR SEARCH THIS CLASS, SUBCLASS:
218+, 227+, 306, and 394, for other combined work rotating and reciprocating.

275 Gear generating:
This subclass is indented under subclass 274. Abrading machine specifically disclosed for forming of gear teeth on a blank.

SEE OR SEARCH THIS CLASS, SUBCLASS:
147, 161, and 219, for other gear grinding machines.

SEE OR SEARCH CLASS:
409, Gear Cutting, Milling, or Planing, subclasses 10+ for gear tooth shape generating and subclasses 65+ for thread or helix generating.

276 Rocking:
This subclass is indented under subclass 272. Abrading machine in which the work holder moves to-and-fro about an axis that coincides with the point of engagement of the abrading tool and the workpiece and the tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:
138, 171, 201+, 204+, 216+, 226+, 266, 276+, and 396, for other rocking work holders.

277 Lens abrader:
This subclass is indented under subclass 276. Abrading machine specifically disclosed for forming the surface of an optical device made from glass, plastic, or other transparent material.

(1) Note. This subclass takes a device for lens surface polishing as well as one for lens generating.

278 Stationary work holder:
This subclass is indented under subclass 259. Abrading machine using a work holder which does not move during the grinding operation.

279 Reversing, obverting, or pivoting:
This subclass is indented under subclass 278. Abrading machine in which the work holder provides for a plurality of work positions by an end for end, edge for edge, or angular swing of the work holder.

SEE OR SEARCH THIS CLASS, SUBCLASS:
232, for a similar work holder in combination with a rotary cylinder abrading tool.

280 Swinging tool carrier:
This subclass is indented under subclass 259. Abrading machine wherein the abrading tool is mounted in a carrier which may be swung to apply the tool to any desired point of the work.

SEE OR SEARCH THIS CLASS, SUBCLASS:
47, 68, 99, 139, 147, 156, 174, and 310, for other swinging tool carriers.

SEE OR SEARCH CLASS:
83, Cutting, subclass 490 for a tool carrier for a rotatable tool which is oscillated or rotated
144, Woodworking, subclass 103 for a woodworking machine, generally mounted on an overhead pivot, adapted to be freely swung to operative position.
409, Gear Cutting, Milling, or Planing, subclass 64, Milling, particularly subclasses 183+ for means to infeed a rotary cutter toward a workpiece.

281 Templet:
This subclass is indented under subclass 259. Abrading machine in which the abrading of the workpiece is under the control of a pattern and a follower.

SEE OR SEARCH THIS CLASS, SUBCLASS:
236+, for other template combinations.

SEE OR SEARCH CLASS:
144, Woodworking, subclasses 134.1+ for shaping of wood.
409, Gear Cutting, Milling, or Planing, subclasses 64+, Milling, particularly subclasses 67+; subclasses 79+ and 130 for a pattern controlled milling machine; and subclasses 290+ for a pattern controlled planing machine.

282 Work guide:
This subclass is indented under subclass 259. Abrading machine using a member to position the workpiece with reference to the tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:
241, 267, 545, 549, and 555, for other work guides.

SEE OR SEARCH CLASS:
76, Metal Tools and Implements, Making, subclasses 82+ for sharpening a cutting tool other than by an abrading member.
144, Woodworking, subclasses 253.1+ for a work guide for a machine of that class.

283 Work rotating:
This subclass is indented under subclass 259. Abrading machine in which the work is turned about an axis while being abraded.

(1) Note. This subclass includes a machine in which the workpiece rotates while being abraded.

SEE OR SEARCH THIS CLASS, SUBCLASS:
134, 140, 189, 209+, 218+, 227+, 242+, 268+, 306, 307+, 317+, 394, and 397+, for other work rotating.

284 Raceway:
This subclass is indented under subclass 283. Abrading machine intended to abrade a workpiece; wherein the workpiece comprises a component of a ball-bearing assembly, particularly the track on which the balls are to ride.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 80+ for disclosure of deforming during rotation of work, especially subclasses 95+ wherein the work is also moved longitudinally.

425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclass 332 for shaping means imparting rolling action to a discrete charge of plastic stock to form a ball.

285 Rotary work holder:

This subclass is indented under subclass 283. Abrading machine including a member adapted to grip and turn with the work about an axis more than 360°.

(1) Note. In this subclass and subclasses indented hereunder are collected rotary work holders other than those for disk and wheel grinders, and those in which the work holder has planetary motion or takes the form of a turret.

SEE OR SEARCH THIS CLASS, SUBCLASS:

82+, 106, 143+, 173, 210, 246+, 269, 285+, 307+, 324+, and 398+, for other rotary work holders used with an abrading machine.

286 By means loosely confining work:

This subclass is indented under subclass 285. Abrading machine wherein the workpiece is bounded by the work holder which is dimensioned so that the workpiece contained therein may move within the holder during the abrading operation.

(1) Note. One type of work holder found herein is a work holding ring which loosely circumscribes the workpiece. Such a ring may be provided with a pressure plate which urges the work into contact with a grinding tool.

287 Planar surface abrading:

This subclass is indented under subclass 285. Abrading machine wherein the work holder rotates the work about an axis either parallel to or coincident with the axis of the abrading tool.

288 Having pressure plate:

This subclass is indented under subclass 287. Abrading machine including means bearing directly upon the work to apply grinding pressure.

SEE OR SEARCH THIS CLASS, SUBCLASS:

286, for a similar machine including a pressure plate in combination with a rotary work holder loosely confining the workpiece.

289 Having vacuum or adhesive securing means:

This subclass is indented under subclass 285. Abrading machine wherein the work holder includes suction or adhesive holding means.

290 Disk or wheel abrader:

This subclass is indented under subclass 285. Abrading machine especially adapted for abrading a rotary platelike member or rolling element.

SEE OR SEARCH THIS CLASS, SUBCLASS:

142, for a roll grinder.

146, 254+, and 258, for other disk or wheel grinders.

348, and 424+, for a roll or wheel grinder.

291 Planetary:

This subclass is indented under subclass 285. Abrading machine in which the work holder revolves about its own longitudinal axis and also rotates about a second generally parallel axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:

135, 211, 271, 291, and 329, for other abrading involving planetary movement.

292 Turret:

This subclass is indented under subclass 285. Abrading machine in which the workpiece is carried by a rotary member which presents a series of workpieces which are also rotating about their own axes in succession to the abrading tool.

(1) Note. The rotary member must pause in the abrading position.

SEE OR SEARCH THIS CLASS, SUBCLASS:
149, 247, 308, and 401, for other turrets.

SEE OR SEARCH CLASS:
29, Metal Working, subclasses 35.5+ for a work or tool turret for a combined machine.
74, Machine Element or Mechanism, subclasses 813+ for an assembly with means to turn a shaft or rotatably mounted device about its axis to one or more selected loci including means to prevent or hold against rotation at such loci.

293 Blade sharpener:
This subclass is indented under subclass 259. Abrading machine especially adapted to sharpen the edge of a cutting member.

294 Means to rotate tool:
This subclass is indented under subclass 177. Abrading machine having detailed mechanisms for transmitting or varying the rotary drive motion to the abrading tool.

(1) Note. Mechanism for varying the rotational speed of the tool in accordance with the diameter of the tool are here classified.

(2) Note. This subclass does not include significant parts of the machine other than the tool drive, such as the tool or work feeds, if provided for in a preceding subclass.

(3) Note. A motor is classified in the appropriate motor classes, but the combination of a motor with a tool rotating mechanism is here classified when the motor class does not provide for the combination.

SEE OR SEARCH THIS CLASS, SUBCLASS:
241+, for an abrading tool which is mounted on or driven from another machine or device which has parts thereof that are to be abraded without removal from the machine or device.

SEE OR SEARCH CLASS:
29, Metal Working, subclass 64 for a speed controlling mechanism for a combined metal working machine.
74, Machine Element or Mechanism, subclasses 325+ for speed change gearing and subclasses 412+ for a gear train.
388, Electricity: Motor Control Systems, subclasses 800+ for a single motor running-speed control system with feedback or subclasses 825+ for a single motor running-speed control system without feedback.
464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, for a flexible coupling between a torque transmitting shaft and a driven member.
474, Endless Belt Power Transmission Systems or Components, for power transmission via an endless belt including control for varying speed ratio.

295 Hydraulic driver:
This subclass is indented under subclass 294. Abrading machine wherein control of the rotary drive motion is by way of fluid pressure.

(1) Note. This subclass takes a patent related to a mechanism for imparting rotary motion to a tool by direct application of fluid pressure, as well as a device for governing the rotary motion of a tool by fluid resistance. Excluded from this subclass is a device which is indirectly actuated by fluid pressure such as a grinder rotated by a piston driven crankshaft.

296 Endless band tool:
This subclass is indented under subclass 64. Abrading machine employing an abrading tool consisting of a traveling flexible belt of abrading material.

SEE OR SEARCH THIS CLASS, SUBCLASS:
355, for a frame or mount for an endless band tool.
491, for other flexible, endless band tools.

513, for a "flexible-member" tool which is an endless band tool.

SEE OR SEARCH CLASS:

99, Foods and Beverages: Apparatus, subclass 616 for an endless belt abrading grain huller.

198, Conveyors: Power-Driven, subclass 837 for specific means for sustaining the belt, holding on a selected path or pressing it against an object.

474, Endless Belt Power Transmission Systems or Components, subclasses 268+ for an endless belt having additional coating, layer, or reinforcement of a diverse kind of material.

297 Belt tracking:

This subclass is indented under subclass 296. Abrading machine having means to correct or adjust the lateral position of the abrading belt on a support roller.

SEE OR SEARCH CLASS:

91, Motors: Expansible Chamber Type, subclass 3 for a jet control-type motor.

137, Fluid Handling, subclass 83 for a jet control pressure modulating relay or follower.

242, Winding, Tensioning, or Guiding, subclasses 534+ and 548+ for a detector, stop, or guide for controlling the position of web material being wound onto a roll.

271, Sheet Feeding or Delivering, especially subclass 2 for feeding an envelope and subclass 6 for feeding and delivering by a continuous endless conveyor.

474, Endless Belt Power Transmission Systems or Components, subclasses 101+ for a device of that class including means for shifting the belt, pulley, or guide roll.

298 Chain:

This subclass is indented under subclass 296. Abrading machine employing an endless abrading band made up of a series of flexibly-connected parts, after the manner of a chain.

SEE OR SEARCH CLASS:

59, Chain, Staple, and Horseshoe Making, subclasses 78+ for chain structure.

474, Endless Belt Power Transmission Systems or Components, particularly subclasses 202+ and 237+ for a drive belt which may be of the link type.

299 One-way work traverse:

This subclass is indented under subclass 296. Abrading machine employing an endless traveling abrading band and nonrotary means for traversing the work past the abrader in one direction only.

SEE OR SEARCH THIS CLASS, SUBCLASS:

130+, 182+, and 260, for other machines having one-way work traverse.

300 Endless work carrier:

This subclass is indented under subclass 299. Abrading machine employing a loop-shaped traveling abrading band and an endless carrier traversing the work past the grinder in one direction only.

SEE OR SEARCH THIS CLASS, SUBCLASS:

167, and 184, for other endless work carriers.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, for a power-driven endless conveyor, per se.

301 Roller work feed:

This subclass is indented under subclass 299. Abrading machine employing an endless traveling abrading band and feed-rollers traversing the work past the grinder in one direction only.

SEE OR SEARCH THIS CLASS, SUBCLASS:

105, 131, 172, 188, and 207, for other roller work feeds.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclass 604, 608, 611+, 624, and 780+ for a conveyor, per se, having a power-driven roller.

302 Opposed endless band abrading tools:
This subclass is indented under subclass 296. Abrading machine employing plural endless traveling abrading bands so mounted as to simultaneously act upon opposite sides of the work.

SEE OR SEARCH THIS CLASS, SUBCLASS:
132+, 194+, and 262+, for other opposed tools.

303 Presser or former:
This subclass is indented under subclass 296. Abrading machine employing an endless traveling abrading band and having means for pressing the band against the work and causing it to conform to the shape thereof.

304 Reciprocating band carrier:
This subclass is indented under subclass 296. Abrading machine employing an endless traveling abrading band so mounted in a carrier as to receive a bodily transverse to-and-fro movement while running.

SEE OR SEARCH THIS CLASS, SUBCLASS:
162+, for other reciprocating tools, particularly subclass 168 for a reciprocating flexible tool.

305 Reciprocating work holder:
This subclass is indented under subclass 296. Abrading machine employing an endless traveling abrading band and a reciprocating work holder.

SEE OR SEARCH THIS CLASS, SUBCLASS:
133, 136+, 168+, 170+, 177+, 212+, 314+, and 320+, for other reciprocating work holders.

306 Work rotating:
This subclass is indented under subclass 305. Abrading machine employing an endless traveling abrading band and a reciprocating work holder in which the work is turned about an axis while being reciprocated.

SEE OR SEARCH THIS CLASS, SUBCLASS:
134, 140, 189, 209+, 218+, 227+, 242+, 268+, 283+, 317+, 394, and 397+, for other work rotating.
218, 227, and 274, for other combined work rotating and reciprocating.

307 Rotary work holder:
This subclass is indented under subclass 296. Abrading machine employing an endless traveling abrading band and a work gripping member which rotates without reciprocation.

SEE OR SEARCH THIS CLASS, SUBCLASS:
82+, 106, 143+, 173, 210, 246+, 269, 285+, 324, and 398+, for other rotary work holders used with an abrading machine.
134, 140, 189, 209+, 218+, 227+, 242+, 268+, 283+, 306, 317+, 394, and 397+, for other work rotating.

308 Turret:
This subclass is indented under subclass 307. Abrading machine wherein a plurality of rotating work holders are indexed by a rotary member into sequential engagement with the abrading tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:
149, 247, 292, 308, and 401, for other turret work holders.

SEE OR SEARCH CLASS:
29, Metal Working, subclasses 35.5+ for a work or tool turret.
74, Machine Element or Mechanism, subclass 813 for a rotary member or shaft for indexing (e.g., a tool or work turret).

309 Superposed endless band tools:
This subclass is indented under subclass 296. Abrading machine employing an endless traveling abrading band backed by a second endless traveling band.

310 Swinging band carrier:
This subclass is indented under subclass 296. Abrading machine employing an endless traveling abrading band mounted on a swinging carrier, permitting it to be positioned with relation to the work.

SEE OR SEARCH THIS CLASS, SUBCLASS:
139, 174, 236, and 280, for other swinging tool carriers.

SEE OR SEARCH CLASS:
144, Woodworking, subclass 103 for a woodworking machine, generally mounted on an overhead pivot, adapted to be freely swung to an operative position.

311 Tension device:
This subclass is indented under subclass 296. Abrading machine for maintaining proper tautness in endless traveling abrading bands.

SEE OR SEARCH CLASS:
474, Endless Belt Power Transmission Systems or Components, particularly subclasses 101+ for a belt tightener.

312 Stationary tool:
This subclass is indented under subclass 64. Abrading machine wherein the abrading takes place solely by movement of the workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:
423, and 428, for a stationary tool attachment.
461+, 526+, and 540+, for abrading tool structure.

SEE OR SEARCH CLASS:
12, Boot and Shoe Making, subclass 79.3 for a stationary tool machine for burnishing boots or shoes.
144, Woodworking, subclass 28.1 for a pencil-sharpening machine (i.e., one having dynamically related tool and work holder or work guide parts), including a stationary tool; and indented subclass 28.11 for a hand manipulable pencil-sharpening machine wherein the tool may be held stationary in one hand while the other hand operates the work holder or work guide.
241, Solid Material Comminution or Disintegration, subclasses 274+ for a single comminuting surface that is stationary relative to material presented to it.

313 Flexible:
This subclass is indented under subclass 312. Abrading machine using a stationary abrading tool of yielding or flexible character.

SEE OR SEARCH THIS CLASS, SUBCLASS:
168+, and 296+, for other flexible tools.

314 Reciprocating work holder:
This subclass is indented under subclass 313. Abrading machine employing a relatively stationary tool of flexible or yielding character and a work holder moving to-and-fro over the same.

SEE OR SEARCH THIS CLASS, SUBCLASS:
133, and see the notes thereto for other reciprocating work holders.
169, for a stropping machine.

315 Needle-eye polisher:
This subclass is indented under subclass 314. Abrading machine employing a relatively stationary tool of flexible or yielding character and a work holder reciprocating thereover, and especially adapted for abrading the eye of a needle.

SEE OR SEARCH CLASS:
163, Needle and Pin Making, subclass 1 for miscellaneous apparatus or process for needle making.

316 Stropping machine:
This subclass is indented under subclass 314. Abrading machine employing a relatively stationary tool of flexible or yielding character and a work holder reciprocating thereover, and especially adapted for stropping a razor blade.

SEE OR SEARCH THIS CLASS, SUBCLASS:
169, and 318, for other strops.
459, for a strop surface renewing device.

SEE OR SEARCH CLASS:

30, Cutlery, subclasses 35+ for a razor feature such as means for securing the blade in operative relation to a gauge or guard that protects the skin from being cut.

317 Work rotating:

This subclass is indented under subclass 313. Abrading machines employing a relatively stationary tool of flexible or yielding character and in which the work rotates.

SEE OR SEARCH THIS CLASS, SUBCLASS:

134, 140, 189, 209+, 218+, 227+, 242+, 268+, 283+, 306, 307+, 394, and 397+, for other work rotating.

318 Stropping machine:

This subclass is indented under subclass 317. Abrading machine employing a relatively stationary tool of flexible or yielding character in which the work rotates, and especially adapted to the stropping of a razor blade.

SEE OR SEARCH THIS CLASS, SUBCLASS:

169, and 316, for other stropping machines.

486, for a strop surface renewing accessory.

SEE OR SEARCH CLASS:

30, Cutlery, subclasses 35+ for a razor feature such as means for securing the blade in operative relation to a gauge or guard that protects the skin from being cut.

319 Rigid:

This subclass is indented under subclass 312. Abrading machine using an inflexible, stationary tool.

(1) Note. Collected in this subclass are machines in which the work rotates independently of the work holder or has motion other than simple reciprocation or rotation.

320 Reciprocating work holder:

Abrading machine 319 employing a relatively stationary tool of rigid character, as a hone or whetstone, and a work holder moving to and fro thereover.

SEE OR SEARCH THIS CLASS, SUBCLASS:

133, 136+, 168+, 170+, 177+, 212+, 305, and 314+, for other reciprocating work holders.

321 Blade sharpener:

This subclass is indented under subclass 320. Abrading machine especially adapted to sharpen the edge of a cutting member.

(1) Note. Sharpening of a razor blade is included in this subclass.

322 Blade reversing:

This subclass is indented under subclass 321. Abrading machine employing a relatively stationary tool of rigid character, as a hone or whetstone, and a work holder reciprocating thereover having means by which the direction of presentation of the blade edge is reversed at each stroke of the work holder.

SEE OR SEARCH CLASS:

30, Cutlery, subclasses 35+ for a razor feature such as means for securing the blade in operative relation to a gauge or guard that protects the skin from being cut.

323 Lens abrader:

This subclass is indented under subclass 320. Abrading machine specifically disclosed for grinding an optical device made from glass, plastic, or other transparent material.

(1) Note. This subclass takes a device for lens surface polishing as well as one for lens generating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

42, for a method of grinding a lens.

240, 255, 256, and 277, for other lens grinders.

324 Rotary work holder:
This subclass is indented under subclass 319. Abrading machine employing a relatively stationary tool of rigid character and in which the work is rotated.

SEE OR SEARCH THIS CLASS, SUBCLASS:
82+, 106, 143+, 173, 210, 246+, 269, 285+, 307+, and 398+, for other rotary work holders used with an abrading machine.

325 Lens abrader:
This subclass is indented under subclass 324. Abrading machine especially adapted for abrading an optical device made from glass, plastic, or other transparent material.

SEE OR SEARCH THIS CLASS, SUBCLASS:
42+, for a lens grinding process.
240, 277, 256, and 323, for other lens grinders.

326 Tumbling device:
This subclass is indented under subclass 64. Abrading machine or abrading shape for use therewith including means for abrading of one or more workpieces during a series of free fall movements, or propulsions, resulting from forces imparted thereon by a work receptacle in motion (generally rotational), and wherein the abrading contact may be: (a) that of mutual attrition between similarly freely moving work bodies; and/or (b) that between a work body and the receptacle wall structure; and/or (c) that exercised by an encompassing fluent particulate mass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
31+, for a tumbling process.
74, for a graining box.
75+, for a sandblast machine.
104+, and 113, for an immersion abrading machine.

SEE OR SEARCH CLASS:
99, Foods and Beverages: Apparatus, subclasses 519+, 560+, and 623 for hulling and peeling apparatus including abrasion by tumbling but in which the material is usually contacted by an abrading tool.
241, Solid Material Comminution or Disintegration, subclasses 170+, and the notes thereto for a rotating receptacle, having a loose grinding material and subclass 284 for mutual attrition or compression comminutors.
366, Agitating, apparatus and methods where there is no abrading or surface-finishing use disclosed.

327 Rotating work about vertical axis:
This subclass is indented under subclass 326. Abrading machine provided with an annular and/or spiral-shaped structure which causes the workpieces to move about a vertical axis in an annular and/or spiral path.

328 Drum:
This subclass is indented under subclass 326. Abrading machine comprising a rotary drum or container, commonly known also as a "rumble."

(1) Note. This subclass is generic or residual with respect to rotary tumbling drums regardless of the expressed function, except as noted in the search notes below.

(2) Note. Included here are means for fluid contact of work combined with drum mechanism. The inclusion of means to treat the fluid, other than pumping or recirculation means, is too much for this subclass and requires classification on the basis of the disclosed function.

SEE OR SEARCH THIS CLASS, SUBCLASS:
85+, for a tumbling barrel having means for delivering an abradant blast upon the work.

SEE OR SEARCH CLASS:
68, Textiles: Fluid Treating Apparatus, subclass 18 for textile treating apparatus including means to reclaim and reuse a solvent.
69, Leather Manufactures, subclass 30 for rotary drum leather treater.

99, Foods and Beverages: Apparatus, subclasses 605+ and 630+ for a drum for hulling or peeling that may rotate.

118, Coating Apparatus, subclass 19 and 417+ for coating apparatus having means to tumble work and coating material.

134, Cleaning and Liquid Contact With Solids, appropriate subclasses for cleaning by tumbling in a rotary drum device without an abradant and involving liquid contact.

165, Heat Exchange, subclass 88 and 89+ for a rotary heat exchange drum.

241, Solid Material Comminution or Disintegration, subclasses 176+ and the notes thereto for rotary drum comminutors.

366, Agitating, subclasses 220+ for a rotary drum agitator.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 209+ for chemical apparatus employing a tank which rotates during use.

329 Planetary:

This subclass is indented under subclass 328. Abrading machine wherein the drum revolves about its own longitudinal axis and also rotates about a second generally parallel axis.

330 Tumbling shapes:

This subclass is indented under subclass 326. Shapes used in connection with a tumbling machine to assist in the abrasion of the workpieces.

SEE OR SEARCH CLASS:

51, Abrasive Tool Making Process, Materials, and Compositions, for abrasive compositions.

241, Solid Material Comminution or Disintegration, subclass 184 for similar articles used in comminution.

331 WORK FEEDER:

This subclass is indented under the class definition. Means for advancing a workpiece into abrading contact with the abrading instrument without regard to the special character of that instrument or of the means for securing the workpiece against displacement.

SEE OR SEARCH THIS CLASS, SUBCLASS:

364+, for means for securing the work in position or traversing it past the grinder.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclasses 227+ and 250+ for feeding a workpiece to a rolling mill.

82, Turning, subclasses 124+ for a lathe having a work feeding or removing means and subclasses 132+ for a lathe carriage feed.

144, Woodworking, subclasses 242.1+ for a feed or presser mechanism particularly adapted for use in woodworking.

221, Article Dispensing, for an article dispenser (feeder) not otherwise provided for, and see the class definition of Class 221 for a statement of the class lines and for the disposition of a related disclosure of an article or strip feeding process or apparatus.

226, Advancing Material of Indeterminate Length, for a method of, or apparatus for, feeding material, without utilizing the leading and trailing end, to effect movement of the material.

409, Gear Cutting, Milling, or Planing, subclasses 288+ for a planing method or machine.

413, Sheet Metal Container Making, subclass 70 for blank work feeding.

332 Rotary:

This subclass is indented under subclass 331. Work feeder wherein the workpiece is carried by a rotating member into contact with the abrading tool.

333 With hopper or magazine:

This subclass is indented under subclass 332. Work feeder including a receptacle for holding and discharging workpieces in a controlled manner to the rotary work feeder.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclass 424 for a receptacle that holds a supply of discrete articles of work to be deformed.

82, Turning, subclasses 125+ for a magazine-type storage means in which a

plurality of pieces of work can be accumulated in an orderly arrangement and positioned such that the pieces may be engaged by the work feeder or remover.

83, Cutting, subclass 417 for means to store work articles including a hopper, work-storage magazine, or gravity fed chute serving to hold a reserve supply of work to be cut.

140, Wireworking, subclass 27 and 28 for a wire fence making machine provided with a hopper that supplies slats for the manufacture of fencing and subclass 53 for a machine having a magazine for a supply of clips, lock plates, or similar members.

221, Article Dispensing, subclasses 241+ for subject matter including means to selectively vary the dimensions of the dispenser or some part thereof to thereby accommodate different size articles and wherein the supply of source dimensions are selectively variable.

470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, subclasses 164+ and see the notes thereto for feeding a nail, screw, or nut blank or nail plate or stock to a machine as part of the manufacture of that class.

334 Reciprocating:

This subclass is indented under subclass 331. Work feeder in which the work conveying means moves the work to effect grinding and cyclically returns with the work generally along the path of the grinding stroke to the starting point.

335 With hopper or magazine:

This subclass is indented under subclass 334. Work feeder including a receptacle for holding and discharging workpieces in a controlled manner to the reciproctating work feeder.

336 Endless:

This subclass is indented under subclass 331. Work feeder in which the workpiece is fed into contact with an abrasive tool by means of a moving, continuous, closed-loop belt or chain.

337 With hopper or magazine:

This subclass is indented under subclass 336. Work feeder including a receptacle for holding and discharging workpieces in a controlled manner to the endless work feeder.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclass 424 for a receptacle that holds a supply of discrete articles of work to be deformed.

82, Turning, subclasses 125+ for a magazine-type storage means in which a plurality of pieces of work can be accumulated in an orderly arrangement and positioned such that the pieces may be engaged by the work feeder or remover.

83, Cutting, subclass 417 for means to store work articles including a hopper, work-storage magazine, or gravity fed chute serving to hold a reserve supply of work to be cut.

140, Wireworking, subclass 27 and 28 for a wire fence making machine provided with a hopper that supplies slats for the manufacture of fencing and subclass 53 for a machine having a magazine for a supply of clips, lock plates, or similar members.

221, Article Dispensing, subclasses 241+ for subject matter including means to selectively vary the dimensions of the dispenser or some part thereof to thereby accommodate different size articles and wherein the supply of source dimensions are selectively variable.

470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus, for feeding a nail, screw, or nut blank or nail plate or stock to a machine as part of the manufacture of that class.

338 Skewed feed rollers:

This subclass is indented under subclass 331. Work feeder in which the workpiece is fed to the abrading tool by rollers wherein the longitudinal axes of the rollers are not parallel to one another and, due to their orientation, cause the workpiece to move toward the tool.

(1) Note. The axes of the rollers or discs are neither intersecting nor parallel to one another.

339 Ejector or unloader:
This subclass is indented under subclass 331. Work feeder in which a mechanism is used to remove the workpiece from the work feeder following the grinding operation.

340 FRAME OR MOUNT:
This subclass is indented under the class definition. Structure for encasing or supporting a grinding device .

SEE OR SEARCH CLASS:
248, Supports, for a frame or mount of general utility.

341 Double treadle:
This subclass is indented under subclass 340. Frame or mount organized to permit driving of the grinding tool by alternately acting treadles.

342 For hanging rigid, rotary abrading tool:
This subclass is indented under subclass 340. Frame or mount for floatingly suspending a rotatable grindstone on or by its shaft in such manner as to prevent breakage or insure true and steady running.

SEE OR SEARCH CLASS:
83, Cutting, subclass 651 for a cutting tool or tool support.

343 With balancing provision:
This subclass is indented under subclass 342. Frame or mount including structure particularly adapted for balancing a rotatable grindstone by properly mounting and distributing weights thereon to insure steady running.

SEE OR SEARCH CLASS:
73, Measuring and Testing, subclass 66 for a process or apparatus for testing for rotor unbalance including a test using adjustable masses.
74, Machine Element or Mechanism, subclass 573 for miscellaneous rotor balancing means.

344 Portable abrader:
This subclass is indented under subclass 340. Frame or mount for an abrading device especially adapted to permit ready transportation thereof, and in general, the application of the abrading tool to the work rather than of the work to the tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:
370, 378, 386, and 391, for a portable clamping-type work holder for abrading an edge tool.

SEE OR SEARCH CLASS:
30, Cutlery, subclasses 166.3+ and 388+ for a portable hand manipulated saw and subclasses 478+ for a hand manipulable planing device.

345 Button cleaner:
This subclass is indented under subclass 344. Frame or mount for an abrading device especially adapted and intended for use on a button of upholstery, clothing, or other article.

SEE OR SEARCH THIS CLASS, SUBCLASS:
448, for a button cleaning shield.

346 Calk sharpener:
This subclass is indented under subclass 344. Frame or mount for an abrading device especially adapted for sharpening the calk of a horseshoe while on the hoof.

SEE OR SEARCH CLASS:
59, Chain, Staple, and Horseshoe Making, subclasses 36+ for miscellaneous horseshoe making.
168, Farriery, subclass 46 for miscellaneous devices for sharpening the calks of horseshoes while on the hoof.

347 Rail abrader:
This subclass is indented under subclass 344. Frame or mount for an abrading device especially adapted for abrading a railway rail in situ.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclasses 54+ for a rail sweeper.

409, Gear Cutting, Milling, or Planing, subclasses 175+ for a portable milling device.

348 Roll or wheel abrader:

This subclass is indented under subclass 344. Frame or mount for an abrading especially adapted to grinding a roll or a wheel.

SEE OR SEARCH THIS CLASS, SUBCLASS:

142, for a roll grinder.

146, 254+, 258, and 290, for a disk or wheel abrading machine.

424+, for a roll or wheel grinder.

349 Edge-tool sharpener:

This subclass is indented under subclass 344. Frame or mount for an abrading device especially adapted for use refurbishing the sharp edge of the blade of a cutting device.

(1) Note. Sharpening a harvester knife is included herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

122, 128, 225, 230, 235, 372+, and 421, for other inventions related to sharpening an agricultural blade (e.g., a mower or reaper knife).

350 Floor surfacing machine:

This subclass is indented under subclass 344. Frame or mount for an abrading device especially adapted for being supported by and abrading the upper surface of a floor.

SEE OR SEARCH THIS CLASS, SUBCLASS:

354, for a wall surfacing machine.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, particularly subclasses 49.1+ and 98+ for a portable floor brushing and wiping machine and subclasses 300.1+ for such machine combined with air blast and/or suction application to the floor.

144, Woodworking, subclasses 117.1+ and 118+ for a rotary cutter type planer and subclasses 134.1+ for a shaper.

351 Reciprocating tool:

This subclass is indented under subclass 350. Frame or mount for a floor surfacing machine wherein the abrading tool moves rectilinearly to-and-fro.

SEE OR SEARCH THIS CLASS, SUBCLASS:

162, for other reciprocating tool abrading machines.

352 Rotary cylinder tool:

This subclass is indented under subclass 350. Frame or mount for a floor surfacing machine wherein the abrading tool is of a shape of a solid generated by a circle moving axially, which tool is intended to turn about its axis and engage to abrade the work by the peripheral surface that is parallel to the axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:

178+, for a rotary cylinder abrading machine.

353 Rotary disk tool:

This subclass is indented under subclass 350. Frame or mount for a floor surfacing machine wherein the abrading tool includes a circular, planar surface, which tool is intended to turn about an axis normal to and passing through that surface to abrade the work by that surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:

158+, 259+, 359, and 548+, for other rotary abrading disk tools.

354 Wall surfacing machine:

This subclass is indented under subclass 344. Frame or mount for an abrading device especially adapted for abrading the planar surface of a vertical wall.

SEE OR SEARCH THIS CLASS, SUBCLASS:

350+, for a floor finishing machine and see the notes thereto.

355 Endless band tool:
This subclass is indented under subclass 344. Device especially adapted for sharpening the cutting edge of a member intended to be used in gathering agricultural produce.

356 Reciprocating tool:
This subclass is indented under subclass 344. Device in which the tool has an alternating back and forth movement.

SEE OR SEARCH THIS CLASS, SUBCLASS:
351, for other portable abrading devices with reciprocating motion.

357 Orbital motion tool:
This subclass is indented under subclass 344. Device in which the abrading tool is revolved in an orbit about a center offset from its axis of rotation.

358 Rotary cylinder tool:
This subclass is indented under subclass 344. Device which has a working face which is parallel to the axis of rotation.

SEE OR SEARCH THIS CLASS, SUBCLASS:
352, for other portable abrading tools having a working surface which is parallel to the axis of rotation.

359 Rotary disk tool:
This subclass is indented under subclass 344. Device which has a planar working surface which is perpendicular to the axis of rotation.

SEE OR SEARCH THIS CLASS, SUBCLASS:
158+, 259+, 353, and 548+, for other rotary abrading disk tools.
353, for other portable abrading tools having a rotary working surface.

360 Rotary tool supporter:
This subclass is indented under subclass 340. Device for supporting an abrading tool spindle for rotation about its axis.

361 Floor or bench stand:
This subclass is indented under subclass 360. Device in which an abrading tool is supported on a stand mounted on the floor or mounted on a work bench.

362 Turret:
This subclass is indented under subclass 360. Device including rotatably indexable means to support a plurality of individually usable abrading tools.

363 Machine head:
This subclass is indented under subclass 360. Device including structure for supporting and driving an abrading tool.

364 WORK HOLDER:
This subclass is indented under the class definition. Means in general for securing the workpiece in position or to facilitate traversing it past the abrader.

(1) Note. A work holder includes means to grippingly secure a workpiece, means to secure a workpiece in position by a vacuum, means to confine and guide a workpiece, etc.

SEE OR SEARCH CLASS:
30, Cutlery, subclasses 329+ for a blade holder to make a general utility knife, but which may be used for holding the blade while sharpening. See (2) Note of the class definition of Class 30.
144, Woodworking, subclasses 306+ for a device for securing work upon a moving bed in a woodworking machine or while operated upon by a traveling woodworking cutter.
269, Work Holders, for a device for clamping, supporting, and/or holding an article (or articles) in position to be operated on or treated. See notes thereunder for other related loci.

365 Clamp:
This subclass is indented under subclass 364. Work holder employing the pressure of a clamping member for holding the work in place during abrading.

SEE OR SEARCH CLASS:

24, Buckles, Buttons, Clasps, etc., subclasses 455+ for a miscellaneous clasp, per se.

366 Work oscillating:

This subclass is indented under subclass 365. Work holder in which the motion of the work is a simple back and forth swinging in an arc, with the work in contact with the abrading surface.

367 Edge tool:

This subclass is indented under subclass 365. Clamping work holder especially adapted for securing a tool element having a sharp cutting edge while being abraded.

SEE OR SEARCH CLASS:

30, Cutlery, subclass 329 for a blade holder and see (2) Note of the class definition of this class (30).

368 Seat controlled:

This subclass is indented under subclass 367. Clamping edge tool holder controllable by connections to a saddle or seat for a human operator.

369 Gauging device:

This subclass is indented under subclass 367. Clamping work holder employing a clamp, especially adapted for securing an edge tool in such position during abrading as to insure its being abraded at the proper angle.

370 Portable:

This subclass is indented under subclass 369. Clamping edge tool holder adapted to be held in the hand and applied thereby to an abrading surface.

371 Blade sharpener:

This subclass is indented under subclass 370. Portable clamping edge tool holder especially adapted to sharpen the edge of a cutting member.

372 Harvester knife:

This subclass is indented under subclass 367. Clamping edge tool holder especially adapted for sharpening the cutting edge of a member intended to be used in gathering agricultural produce.

SEE OR SEARCH THIS CLASS, SUBCLASS:

122, 128, 225, 230, 235, 349, and 421, for other inventions related to sharpening an agricultural blade (e.g., a mower or reaper knife).

373 Suspension:

This subclass is indented under subclass 372. Clamping harvester knife holder especially adapted to suspend a harvester knife from an overhead support while being abraded.

374 Rotary cutter:

This subclass is indented under subclass 367. Clamping edge tool holder especially adapted to hold an edge tool while being abraded, which tool, when used, will turn more than 360° about an axis.

375 Drill:

This subclass is indented under subclass 374. Clamping rotary edge tool holder especially adapted for securing a drill bit in position while being abraded.

376 Pattern control:

This subclass is indented under subclass 375. Clamping drill bit holder having a templet for controlling movement of the drill bit when in contact with the abrading surface.

377 Work reciprocating:

This subclass is indented under subclass 367. Clamping edge tool holder especially adapted for holding an edge tool which is positively reciprocated past an abrading device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

388, for vacuum work holders.

392+, for a work holder for reciprocating a workpiece, other than an edge tool, during an abrading operation.

378 Portable:

This subclass is indented under subclass 367. Clamping edge tool holder adapted to be manually held, thereby applying the workpiece to an abrading surface.

379 Work rotating:
This subclass is indented under subclass 367. Clamping edge tool holder wherein gripping means support the workpiece to turn more than 360° during the abrading operation.

(1) Note. The rotation may be by means other than the work holder.

380 Angularly adjustable:
This subclass is indented under subclass 367. Clamping edge tool holder having means to adjustably orient the workpiece about an axis in at least two different positions relative to the abrading surface.

381 Hollow work:
This subclass is indented under subclass 365. Clamping work holder especially adapted for holding a hollow workpiece.

(1) Note. The workpiece of this subclass is commonly made of glass.

SEE OR SEARCH CLASS:
279, Chucks or Sockets, subclasses 2.01+ and 9.1+ for an expanding socket-type chuck.

382 Hypodermic needle:
This subclass is indented under subclass 381. Clamping work holder especially adapted for holding a hypodermic needle during abrading.

383 Skate:
This subclass is indented under subclass 365. Clamping work holder especially adapted for holding an ice skate runner while being sharpened by abrading.

SEE OR SEARCH CLASS:
76, Metal Tools and Implements, Making, subclass 83 for a skate sharpener which uses a nonabrasive tool.

384 Lens holder:
This subclass is indented under subclass 365. Work holder particularly adapted for securing a lens during abrading.

385 Work rotating:
This subclass is indented under subclass 365. Work holder having means to permit the workpiece to turn more than 360° while it is in contact with the abrading surface.

(1) Note. The rotation may be by means other than the work holder, per se.

SEE OR SEARCH THIS CLASS, SUBCLASS:
402, for other rotary work holders.

386 Portable:
This subclass is indented under subclass 365. Clamping work holder adapted to be manually held, whereby the workpiece is applied to an abrading surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:
391, for a portable-type work holder but with other means to secure the workpiece.

387 Angularly adjustable:
This subclass is indented under subclass 365. Clamping work holder having means to adjustably orient the workpiece about an axis in at least two different positions relative to the abrading surface.

388 Vacuum:
This subclass is indented under subclass 364. Work holder in which the workpiece is held in place by atmospheric pressure brought into play by exhaustion of air from one side of the workpiece.

SEE OR SEARCH CLASS:
279, Chucks or Sockets, subclass 3 for a vacuum-operated chuck mechanism, and see the notes thereto for similar subject matter.

389 Dop or dop stick:
This subclass is indented under subclass 364. Work holder especially adapted for holding a jewel while being faceted or otherwise abraded comprising the member on which the jewel is placed or comprising structure for supporting that member.

(1) Note. The workpiece of this subclass may be diamond.

390 Lens or prism:
This subclass is indented under subclass 364. Work holder especially adapted for holding a workpiece comprising an optical device for intentionally directing light rays.

(1) Note. The workpiece of this subclass may be made from glass, plastic, or other transparent material.

391 Portable:
This subclass is indented under subclass 364. Work holder adapted to be held in hand and applied thereby to the abrading surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:
370, and 386+, for other portable fixtures.

392 Work reciprocating:
This subclass is indented under subclass 364. Work holder especially adapted for holding a workpiece which is moved to-and-fro past an abrading device.

(1) Note. Included herein is a work holder having (a) simple rectilinear reciprocating motion, (b) oscillating motion, (c)reciprocating motion combined with rotary motion, or (d) rocking motion.

SEE OR SEARCH THIS CLASS, SUBCLASS:
133, 136, 170+, 199+, 212+, 264+, 272+, 305+, 314+, 320+, and 377, for other reciprocating work holders.

393 Rectilinearly:
This subclass is indented under subclass 392. Work holder for holding a workpiece as it is reciprocated along a straight line past an abrading device.

394 And work rotating:
This subclass is indented under subclass 393. Work holder in which the workpiece is rotated while being reciprocated.

SEE OR SEARCH THIS CLASS, SUBCLASS:
134, 140, 189, 209+, 218+, 227+, 242+, 268+, 283+, 306, 307+, 317+, and 397+, for other work rotating.
218+, 227+, 274+, and 306, for other combined work rotating and reciprocating.
397, for a work holder in which the workpiece rotates without a reciprocating component, and see the notes thereto for other work rotating.

395 Hydraulically actuated:
This subclass is indented under subclass 393. Work holder including a fluid pressure motor to produce reciprocation past the abrading surface.

SEE OR SEARCH CLASS:
408, Cutting by Use of Rotating Axially Moving Tool, subclass 63 for a drilling machine in which a table supporting a workpiece is fed to a rotating drill along the axis of rotation by a fluid pressure motor.

396 Rocking:
This subclass is indented under subclass 392. Work holder which moves to-and-fro about an axis that coincides with the point of engagement of the abrading tool and the workpiece and the tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:
138, 171, 201+, 204+, 216+, 226+, 266, and 276+, for other rocking work holders.

397 Work rotating:
This subclass is indented under subclass 364. Work holder in which the work is guided in rotation during grinding.

(1) Note. Included herein is a device in which the work rotates without a specific rotary work holder.

SEE OR SEARCH THIS CLASS, SUBCLASS:
134, 140, 189, 209+, 218+, 227+, 242+, 268+, 283+, 306, 307+, 317+, and 394, for other work rotating.

398 Rotary work holder:
This subclass is indented under subclass 397. Work holder comprising rotary member holding and turning with the workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:
82+, 106, 143+, 173, 210, 246+, 269, 285+, 307, 324, and 398+, for other rotary work holders used with an abrading machine.

399 Crank shaft:
This subclass is indented under subclass 398. Rotary work holder especially adapted for holding the rotary component of an engine intended to receive power to an eccentric portion thereof from a reciprocating piston via a connecting rod.

400 Orbital movement:
This subclass is indented under subclass 398. Rotary work holder which revolves in an orbit about a center outside itself.

SEE OR SEARCH THIS CLASS, SUBCLASS:
270+, for an orbital work holder for an abrading machine having a radial-faced rotary tool.

401 Turret:
This subclass is indented under subclass 398. Rotary work holder in which a series of rotating workpieces are indexed by a rotary member into sequential engagement with the abrading tool.

(1) Note. The workpiece is not in contact with the abrading means during indexing.

SEE OR SEARCH THIS CLASS, SUBCLASS:
149, 247+, 292, and 308, for other turret work holders.

SEE OR SEARCH CLASS:
29, Metal Working, subclasses 35.5+ for plural diverse manufacturing apparatus including a tool or tool turret.
74, Machine Element or Mechanism, subclasses 813+ for rotary member indexing, generally.

402 Rotary:
This subclass is indented under subclass 364. Work holder in which gripping means support the workpiece in such a manner as to allow the workpiece to turn more than 360° during the abrading operation.

SEE OR SEARCH CLASS:
269, Work Holders, subclasses 37+ for plural work holders to hold workpieces relative to each other and subclasses 86+ for a work holder having relatively movable jaws.

403 Indexing:
This subclass is indented under subclass 364. Work holder with structure to allow the position of the workpiece to be changed with regular steplike movements.

SEE OR SEARCH THIS CLASS, SUBCLASS:
139, 214, 232, and 403, for other indexing work holders.

SEE OR SEARCH CLASS:
74, Machine Element or Mechanism, subclasses 813+ for an assembly with means to turn a shaft of a rotatably mounted device about its axis to one or more selected loci including means to prevent or hold against rotation at such loci.
408, Cutting by Use of Rotating Axially Moving Tool, subclasses 44+ and 70+ for intermittently operating work advancing means to sequentially present work to a tool of the class type.
409, Gear Cutting, Milling, and Planing, subclass 61 for gear cutting which commonly includes indexing and subclass 198 for an indexable workholder.

404 Hand operated:
This subclass is indented under subclass 403. Work holder in which the position of the workpiece can be changed manually.

405 Angularly adjustable:
This subclass is indented under subclass 364. Work holder in which the position of the workpiece can be changed about an axis.

406 WORK REST:
This subclass is indented under the class definition. Device for supporting a workpiece against the force of gravity, without positive holding means, while held in the hand of the operator.

SEE OR SEARCH THIS CLASS, SUBCLASS:
216+, for a work support with positive holding means.

SEE OR SEARCH CLASS:
82, Turning, subclasses 162+ for a work rest for a lathe, other than a wood turning lathe.
142, Wood Turning, subclass 48 for a work rest for a wood cutting lathe.

407 For centerless abrader:
This subclass is indented under subclass 406. Work rest especially adapted for supporting the workpiece in a grinding machine in which the abrading tool turns about a continuously moving axis passing through the tool.

408 Steady rest:
This subclass is indented under subclass 406. Work rest for providing additional support to the workpiece to prevent deflection or vibration of the workpiece and to maintain the workpiece in a firm or stable condition.

409 Tool tooth rest:
This subclass is indented under subclass 406. Work rest especially adapted to support a tooth of a cutting tool during abrading.

410 Gauging device:
This subclass is indented under subclass 406. Work rest especially adapted to insure abrading to a desired angle.

411 WORK TABLE:
This subclass is indented under the class definition. Device including a generally planar work upper surface on which it is intended for a workpiece to be supported during abrading.

(1) Note. The work table of this subclass is generally intended to support a workpiece while being abraded by a randomly manipulated abrading tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:
364+, for a positive work holder.
406+, for a work rest.

SEE OR SEARCH CLASS:
144, Woodworking, subclass 285 and 286.1+ for a work bench for use in woodworking.
409, Gear Cutting, Milling, or Planing, subclasses 219+ for a work table particularly adapted to be used with a milling machine.

412 Glass work:
This subclass is indented under subclass 411. Work table especially adapted for supporting a sheet of glass.

413 Work rotating:
This subclass is indented under subclass 411. Work table which rotates about its central axis.

414 Angularly adjustable:
This subclass is indented under subclass 411. Work table having means to adjustably orient the work about an axis in at least two different positions relative to the tool.

415 ATTACHMENT:
This subclass is indented under the class definition. Device intended (a) to be secured to a nonabrading machine or tool for grinding a part thereof (b) to be secured to a nonabrading machine or tool to be driven or supported thereby.

(1) Note. A device attached to the tool or element to be abraded (as for example, a sawing or drilling machine), whether or not said tool or element is mounted in a machine, is also classified here and in indented subclasses.

416 To textile machine to abrade card:
This subclass is indented under subclass 415. Attachment to be secured to a textile working machine for grinding a surface of a member used to align textile fibers.

(1) Note. Collected in this subclass is an attachment for a carding machine other than one using flat cards.

SEE OR SEARCH CLASS:
19, Textiles: Fiber Preparation, subclass 98 for a carding machine.

417 Flat card:
This subclass is indented under subclass 416. Attachment to be secured to a textile working machine which uses flat cards for abrading a card thereof.

418 To electrical machine to abrade commutator:
This subclass is indented under subclass 415. Attachment adapted to be secured to an electric motor or generator and to abrade the commutator thereof.

419 To cutting machine to sharpen blade:
This subclass is indented under subclass 415. Attachment adapted to be secured to a cutting machine to be used for sharpening a cutting blade thereof.

(1) Note. Included herein is an attachment for a lawn mower, a meat cutter, a leather cutter, a cloth cutter, etc.

(2) Note. A “drill” or a “saw” is considered to be a cutting blade.

SEE OR SEARCH CLASS:
30, Cutlery, subclasses 35+ for a significantly recited razor combined with a sharpening means and subclasses 138+ for a significantly recited cutlery implement, generally combined with a sharpening means.
56, Harvesters, subclass 250 for a significantly recited rotating cutting reel mower organization modified to facilitate sharpening.
76, Metal Tools and Implements, Making, subclass 82.1 for a lawn mower sharpening attachment of the cutting type, rather than the abrading type.

420 Rotary abrading tool:
This subclass is indented under subclass 419. Machine knife sharpening attachment in which the knife is ground by a tool having only a rotary movement.

SEE OR SEARCH THIS CLASS, SUBCLASS:
177+, and see the notes thereto for other rotary tools.

SEE OR SEARCH CLASS:
30, Cutlery, subclass 139 for a significantly recited cutlery implement, generally combined with a rotary sharpening means.
69, Leather Manufactures, subclass 38 for a leather dressing rotary cutting tool with a grinding attachment where significant structure of the cutting tool is claimed.

421 Rotary reciprocating tool:
This subclass is indented under subclass 420. Machine knife sharpening attachment in which the sharpening is done by a grinder having both rotary and reciprocating motion.

SEE OR SEARCH THIS CLASS, SUBCLASS:
119+, and see the notes thereto for other rotary reciprocating tools.
122, 128, 225, 230, 235, 349, and 372+ for other inventions related to sharpening an agricultural blade (e.g., a mower or reaper knife).

SEE OR SEARCH CLASS:
30, Cutlery, subclass 139 for a significantly recited cutting implement combined with a rotary blade sharpener.

422 Work actuated:
This subclass is indented under subclass 420. Machine knife sharpening attachment in which the knife is abraded by a tool having only rotary motion and driven by contact with the knife being sharpened.

423 Stationary abrading tool:
This subclass is indented under subclass 419. Machine knife sharpening attachment wherein the grinding means is immobile during the grinding operation (i.e., the blade being ground moves relative thereto).

SEE OR SEARCH THIS CLASS, SUBCLASS:
312+, and see the notes thereto for other stationary tool machines.
428, for other stationary tool attachments.

424 Roll or wheel abrader:
This subclass is indented under subclass 415. Attachment adapted to be secured to a machine having a relatively smooth annular surface intended to grind such surface.

(1) Note. A device intended to be attached to a metal deforming rolling machine, a calendaring machine, or a machine having a pulley with an annular surface is included herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:
142, for a roll abrader.
146, 258, 254+, 290, and 348, for a disk or wheel abrading machine.
348, for a roll or wheel abrader.

SEE OR SEARCH CLASS:
82, Turning, subclass 103 for a lathe for making a pulley and subclasses 104+ for a wheel or axle lathe.
172, Earth Working, subclass 437 for a significantly claimed earth working apparatus combined with a device for sharpening an earth working tool.

425 Rotary reciprocating tool:
This subclass is indented under subclass 424. Attachment including a grinder having both a rotary and a reciprocating motion.

SEE OR SEARCH THIS CLASS, SUBCLASS:
119+, and see the notes thereto for other rotary reciprocating tools; see particularly subclasses 142 and 146 for roll, disk, and wheel grinders.

426 Reciprocating tool:
This subclass is indented under subclass 424. Attachment employing a reciprocating nonrotary grinder.

SEE OR SEARCH THIS CLASS, SUBCLASS:
162+, and see the notes thereto for other reciprocating tools.

427 Nut-and-screw-type drive:
This subclass is indented under subclass 426. Attachment employing means to cause the abrasive tool to reciprocate comprising a helical male member and a cooperating helical female member, one of which rotates with respect to the other.

428 Stationary abrading tool:
This subclass is indented under subclass 424. Attachment in which the roll or wheel being ground revolves against a relatively fixed grinding means.

SEE OR SEARCH THIS CLASS, SUBCLASS:
312+, for an abrading machine having a stationary tool, generally.
423, for other stationary tool attachments.

429 To rail:
This subclass is indented under subclass 415. Attachment particularly adapted to be attached to and grind an elongated member on which a vehicle is to ride.

430 Valve or valve seat abrader:
This subclass is indented under subclass 415. Attachment especially adapted for grinding a surface of the stationary portion or a movable portion of a valve.

SEE OR SEARCH THIS CLASS, SUBCLASS:
115, and 252, for other valve abraders.

431 Orbital tool:
This subclass is indented under subclass 430. Attachment in which the grinding tool revolves about a center outside itself.

SEE OR SEARCH THIS CLASS, SUBCLASS:
270+, and 441, for other orbital tools.

432 To sewing machine:
This subclass is indented under subclass 415. Attachment to be secured to some part of a sewing machine and driven thereby.

SEE OR SEARCH CLASS:
112, Sewing, subclass 257 for means for holding an attachment to a sewing machine.

433 To be driven by flywheel:
This subclass is indented under subclass 432. Attachment to be secured to and driven by the flywheel of a sewing machine.

434 To vehicle:
This subclass is indented under subclass 415. Attachment to be secured to a vehicle and driven thereby.

435 To lathe:
This subclass is indented under subclass 415. Attachment to be secured to a lathe.

(1) Note. The attachment of this subclass may be adapted to be driven by a lathe to abrade a workpiece or may be attached to a lathe in such a way as to abrade a workpiece driven by the lathe.

SEE OR SEARCH CLASS:
82, Turning, for a lathe, generally.
142, Wood Turning, for a lathe for shaping wood.

436 Center abrader:
This subclass is indented under subclass 435. Lathe attachment especially adapted to the grinding of a lathe center.

(1) Note. The device of this subclass may be used to true a lathe center.

437 Internal abrader:
This subclass is indented under subclass 435. Lathe attachment especially adapted for grinding the interior of hollow work.

438 To work guide:
This subclass is indented under subclass 415. Attachment provided with a member for locating a workpiece relative to the abrading tool.

439 To the work:
This subclass is indented under subclass 415. Attachment especially adapted to be mounted on the member being abraded.

440 Internal abrader:
This subclass is indented under subclass 415. Attachment to be secured to hollow work for abrading the interior thereof.

441 Orbital tool:
This subclass is indented under subclass 415. Attachment in which the grinding tool revolves about a center outside itself.

SEE OR SEARCH THIS CLASS, SUBCLASS:
270+, and 431, for other orbital grinders.

442 ACCESSORY:
This subclass is indented under the class definition. Apparatus intended to be used with and to augment the operation of a device under the class definition.

(1) Note. Included herein is an apparatus or part that is a part of or is separate from the device under the class definition, unless provided for in a preceding subclass.

(2) Note. This subclass takes an abradant-resist (i.e., mask or stencil defining a work area and protecting underlying surface portions of the workpiece). However, a nominal recitation (e.g., “stencil sheet designed for cutting”) followed by a definition of a miscellaneous product of a Class 427 type of coating operation, or of a rubber chemistry material composition, or of a stock material blank, would each be deemed to recite insufficient abradant-resist structure for placement in this subclass and will be found in that class taking the defined subject matter.

SEE OR SEARCH THIS CLASS, SUBCLASS:

29+, for an abradant-resist mask or stencil utilized in an abrading process.

SEE OR SEARCH CLASS:

33, Geometrical Instruments, for a guide or gauge.

99, Foods and Beverages: Apparatus, subclass 388 and 430 for a stencil related to marking food during the cooking thereof.

101, Printing, subclasses 48+, 112, and especially subclasses 114+ for a mask or stencil or for a process utilizing same to define an area to be printed.

106, Compositions: Coating or Plastic, for resists recited by composition, or method of compounding, of that class.

118, Coating Apparatus, subclass 213, 301, 406, and 504 for a work surface protector used in coating.

132, Toilet, subclass 319 for a stencil used in the application of cosmetics.

260, Chemistry of Carbon Compounds, for a resist recited by composition, or method of compounding, of that class.

443 Dressing:

This subclass is indented under subclass 442. Accessory for returning an abrading tool to a predetermined shape or form after or during use.

SEE OR SEARCH THIS CLASS, SUBCLASS:

70, for an abrading machine with a dressing device.

444 Tool cleaner:

This subclass is indented under subclass 442. Accessory for removing the products of abrading from the abrading tool.

445 Erasing shield:

This subclass is indented under subclass 442. Accessory intended to be used in association with an eraser, which accessory is either (a) to be interposed between the active surface of a carbon sheet and an underlying sheet to prevent sullying of the underlying sheet during an erasure operation or (b) has holes therethrough to define limits of an erasure area when the accessory is positioned over a sheet requiring erasure.

(1) Note. An “eraser” is a device intended to remove a coating from a surface, generally wherein that coating comprises printed information.

446 Abradant supplying:

This subclass is indented under subclass 442. Accessory intended to provide abrading material to the tool under the class definition.

SEE OR SEARCH THIS CLASS, SUBCLASS:

60, for a method of abrading with applying of abrasive material.

75+, for a sandblast machine which may be in combination with an abradant supply, particularly subclass 99 for a nozzle, supply tank, or valve.

SEE OR SEARCH CLASS:

222, Dispensing, for a dispenser in general, and see particularly the notes in section 16 of the main class definition of Class 222 for the distribution of related art.

447 Grader:

This subclass is indented under subclass 446. Abradant supplying accessory including means for sorting used abradant into portions of differing fineness and returning that which is suitable for reuse.

SEE OR SEARCH CLASS:

209, Classifying, Separating, and Assorting Solids, particularly subclasses 155+ for liquid suspension type.

448 Button cleaning shield:

This subclass is indented under subclass 442. Accessory comprising a protector for a garment to which a button is attached to prevent injury of the garment while a button is being cleaned or polished.

SEE OR SEARCH THIS CLASS, SUBCLASS:

345, for a portable button cleaner.

457, for other work protecting shields.

449 Cooling:
This subclass is indented under subclass 442. Accessory for preventing excessive heating of the work or tool during the abrading operation.

450 Wetting grindstone:
This subclass is indented under subclass 449. Cooling accessory for applying a liquid cooling agent to an abrading tool.

451 Guard or housing:
This subclass is indented under subclass 442. Accessory comprising a protective shield or an enclosure (e.g, a hood or guard) to be mounted on an abrading device.

SEE OR SEARCH CLASS:
74, Machine Element or Mechanism, subclasses 606+ for means for enclosing a gear mechanism, subclasses 608+ for means for protectively covering a gear mechanism, and subclasses 612+ for means for protecting a human operator from engagement by the gears of a gear mechanism.
83, Cutting, subclass 440.2, 544+, and 814+ for a saw guard.
112, Sewing, subclass 261 for a cover or guard for the moving parts of a sewing machine.
144, Woodworking, subclasses 251.1+ and 252.1+ for a cutter guard, hood, or dust conveyor.
192, Clutches and Power-Stop Control, subclasses 116.5+ for a stop mechanism, particularly subclasses 129+ for a safety device.
474, Endless Belt Power Transmission Systems or Components, particularly subclasses 144+ for a guard or housing for a belt or pulley forming a part of a power transmission.

452 Breakage guard:
This subclass is indented under subclass 451. Guard or housing intended to prevent damage in case of breakage of a rapidly turning abrading wheel.

453 Collector:
This subclass is indented under subclass 451. Guard or housing for collecting loose particles from an abrading member or work thrown off during the abrading operation.

SEE OR SEARCH CLASS:
96, Gas Separation: Apparatus, for gas separation apparatus, per se, for separating particles from a confined gas stream.
144, Woodworking, subclass 252.1 for a cutter hood or dust conveyor for a woodworking machine.

454 Drive shield:
This subclass is indented under subclass 451. Guard or housing intended to prevent foreign material from entering the driving structure of a device under the class definition.

SEE OR SEARCH CLASS:
144, Woodworking, subclass 252.1 for a cutter hood or dust conveyor for a woodworking machine.

455 Spark or splash guard:
This subclass is indented under subclass 451. Guard or housing for confining sparks developed in abrading or preventing splashing of cooling or lubricating fluid.

456 Suction:
This subclass is indented under subclass 451. Guard or housing having air exhausting means for drawing off dust developed in the abrading operation.

SEE OR SEARCH CLASS:
144, Woodworking, subclass 252.1 for a cutter hood or dust conveyor for a woodworking machine.

457 Work guard:
This subclass is indented under subclass 451. Guard or housing for preventing injury to other parts of the work other than those being intentionally abraded.

SEE OR SEARCH THIS CLASS, SUBCLASS:
448, for a button cleaning shield.

458 Abrading sheet applying device:
This subclass is indented under subclass 442. Accessory for fitting or attaching a sheet of abrading material to a sheet holder to constitute a flexible abrading tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:
490, for a tool support for a flexible member tool, including a sheet applying device.

459 Strop surface renewing:
This subclass is indented under subclass 442. Accessory for smoothing, coating, or otherwise treating the surface of a used strop to restore it to its originally effective condition.

SEE OR SEARCH THIS CLASS, SUBCLASS:
169, 316, and 318, for a stropping machine, generally.

460 Work-mounting device:
This subclass is indented under subclass 442. Accessory for properly positioning work in a work holder.

SEE OR SEARCH CLASS:
82, Turning, subclass 170 for a work centering device not otherwise classified, and see the notes thereto.

461 COMBINED TOOL:
This subclass is indented under the class definition. Abrading implement having two or more tools, at least one of which is of the class type and at least one of which is not of the class type, carried by a common operating handle or other support.

(1) Note. An example of the tool of this class is an implement including an abrading portion and a cutting portion.

SEE OR SEARCH THIS CLASS, SUBCLASS:
65+, for a machine having abrading tools of more than one type.

SEE OR SEARCH CLASS:
76, Metal Tools and Implements, Making, subclasses 82+ for sharpening a sharp tool, other than by abrading.

462 Internal:
This subclass is indented under subclass 461. Combined tool for grinding the interior of a hollow workpiece.

463 CARRIER FOR RELATIVELY MOVABLE SIMULTANEOUSLY USABLE TOOLS:
This subclass is indented under the class definition. Device provided with a means for mounting a plurality of abrading tools for abrading movement of all the tools at the same time in which means at least one of said tools is also mounted for urging movement (i.e., movement of a tool into engagement or continued engagement with a surface of the work) or for adjustment with respect to the other(s).

SEE OR SEARCH THIS CLASS, SUBCLASS:
526+, for a support having a tool integrally bound thereto.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing, and General Cleaning, subclass 208 and more specifically subclass 230 for a support having means to secure a nonabrasive tool thereto.
82, Turning, subclass 169 for an expandable mandrel for supporting a rotating workpiece being machined.
175, Boring or Penetrating the Earth, subclass 263 for an earth boring tool which is expansible.
279, Chucks or Sockets, subclasses 2.07+ for an expandable chuck.
294, Handling: Hand and Hoist-Line Implements, subclass 93 for an expandable grapple.
408, Cutting by Use of Rotating Axially Moving Tool, subclass 42 for plural tools of that class type operable at the same time.
474, Endless Belt Power Transmission Systems or Components, particularly subclasses 47+ for a pulley with expansible rim means.

492, Roll or Roller, for a roll, per se, not elsewhere provided for, and see the notes thereto for the loci of a particular roll or combination involving a roll; search particularly subclasses 5+ for an expansible roll.

464 For radially movable tools:
This subclass is indented under subclass 463. Carrier wherein the abrading movement of the tools relative to the work is about the axis of rotation of either the tools and their carrier or the work, and the urging movement of the tools relative to the work is along components of movement perpendicular to said axis.

465 Centrifugal force urged tools:
This subclass is indented under subclass 464. Carrier comprising a rotatable carrier having tools mounted thereon for radial movement with respect to the axis of rotation of the carrier whereby the rotation of the carrier will tend to move the tools away from the axis of rotation.

SEE OR SEARCH THIS CLASS, SUBCLASS:
506, for a tool support expanded by centrifugal force.

466 Flexible flail tools:
This subclass is indented under subclass 465. Carrier wherein the carrier has secured thereto or therein a plurality of flexible-member tools which project outwardly from the axis of the carrier so that their radial ends are free to flex with a radially outward component of motion.

(1) Note. See subclass 526 for the definition of "flexible-member tool."

SEE OR SEARCH THIS CLASS, SUBCLASS:
468, indented hereunder, for a carrier having tool supports projecting from the carrier, which supports assist in urging the tools toward the work or back up the tool to prevent them from overflexing. Included in this subclass, but not meeting the definition of subclass 468, is such a device without back-up supports on the carrier.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing, and General Cleaning, subclass 230 for a rotary cleaning implement having fabric portions adapted to act as a wiper, dauber, or polisher.
26, Textiles: Cloth Finishing, subclass 28 for an abradant device limited to treatment of cloth.

467 With tool supply or storage:
This subclass is indented under subclass 466. Carrier for holding additional tool material within the carrier.

(1) Note. Additional material can be fed to operative position while the device is idle or operating.

SEE OR SEARCH THIS CLASS, SUBCLASS:
491+, for a tool supply carried by a tool support.

468 Including self-sustaining tools:
This subclass is indented under subclass 466. Carrier wherein only the tools project outwardly from the carrier.

(1) Note. See (2) Note of subclass 466 definition.

469 With discrete nondestructible tool-securing means:
This subclass is indented under subclass 468. Carrier wherein a flexible-member tool is held to the carrier by a separable element which may be removed from the carrier without destroying said element and then reused for reassembly of tool to carrier.

SEE OR SEARCH THIS CLASS, SUBCLASS:
490+, for means to secure a tool to a tool support.

470 Including conoid or wedge tool moving member:
This subclass is indented under subclass 464. Carrier wherein means having a configuration defined by a cone (or conelike surface) or intersecting planes causes radial movement of the tool(s).

471 With threaded operator:
This subclass is indented under subclass 470. Carrier having helical screw means for moving the cone or wedge member(s) to cause radial movement of the tool(s).

472 To move conoid member:
This subclass is indented under subclass 471. Carrier wherein the member(s) actuated by the helical screws means comprises a cone.

473 To actuate pivotally mounted tools:
This subclass is indented under subclass 472. Carrier wherein the tools are so secured to the carrier that when urged by the cone means they may arcuately swing away from the axis of the carrier and into engagement with the work.

474 For movement of conoid members relative to each other:
This subclass is indented under subclass 472. Carrier wherein the members are moved toward or away from one another by the helical screw means.

475 By conoid member with screw threads:
This subclass is indented under subclass 472. Carrier wherein a helical screw means is fastened to or integral with the cone member.

SEE OR SEARCH THIS CLASS, SUBCLASS:
474, for other conoid members with integral or directly attached screw threads.

476 Including plural conoid members:
This subclass is indented under subclass 472. Carrier embodying two or more such cone (or conelike) surfaces.

477 Including key-way or spline:
This subclass is indented under subclass 471. Carrier wherein the screw actuated taper or wedge member is on, and an integral part of, the tool carrier and said member is recessed into or protrudes from said carrier; said member also being angularly related to and extending along the axis of said carrier thus having a wedgelike configuration.

478 Conoid member:
This subclass is indented under subclass 470. Carrier wherein the tool moving surface is conical or cone like.

479 Including gear actuated tool mover:
This subclass is indented under subclass 464. Carrier in which means having toothed surfaces causes the radial movement of the tool.

480 Including lever actuated tool mover:
This subclass is indented under subclass 464. Carrier wherein the radial motion of at least one of the tools is caused by a link pivoted on a fulcrum between the tool and a force applicator.

481 Including hydraulically actuated tool mover:
This subclass is indented under subclass 464. Carrier wherein gas or liquid under pressure causes the radial movement of the tool(s).

SEE OR SEARCH THIS CLASS, SUBCLASS:
505, for radial expansion of flexible tool by fluid pressure.

482 Including thread actuated tool mover:
This subclass is indented under subclass 464. Carrier wherein helical screw means causes the radial movement of one or more tools relative to the carrier.

483 Interrelated to move plural tools:
This subclass is indented under subclass 482. Carrier wherein the radial movement of more than one such tool is simultaneously caused by manipulation of a single element.

484 Including resiliently urged tool:
This subclass is indented under subclass 464. Carrier wherein springlike means causes the radial movement of one or more tools relative to the carrier.

SEE OR SEARCH THIS CLASS, SUBCLASS:
504+, for resilient tool supports causing radial expansion of a tool.

SEE OR SEARCH CLASS:

492, Roll or Roller, subclass 42 for a roll, per se, which includes coil or leaf springs supporting the working surface.

485 By coil spring:

This subclass is indented under subclass 484. Carrier wherein the springlike means is a resilient member in the form of a helix wound about a centerline which, through force directed along such centerline, produces the tendency toward radial movement.

486 Including tools resiliently urged toward work:

This subclass is indented under subclass 463. Carrier wherein the mounting means includes elements which yieldingly bias the tools toward a common line or plane in which line or plane the work lies.

487 CARRIER FOR A RADIALLY MOVABLE TOOL:

This subclass is indented under the class definition. Device provided with a means for mounting a single tool for abrading movement of that tool about an axis of rotation of either the tool and its mounting or the work, and for movement perpendicular to said axis urging the tool into engagement with a surface of the work.

SEE OR SEARCH THIS CLASS, SUBCLASS:

463+, for a carrier having radially movable tools.

488 VENTILATION OR COOLING OF TOOL OR TOOL SUPPORT:

This subclass is indented under the class definition. Device having means to cause or permit circulation of fluent material to or adjacent, or to dissipate heat from, a tool or its support.

(1) Note. For the definition of "tool support," see subclass 490.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclass 230.1 for similar ventilation or cooling of a tool or its support.

489 FLEXIBLE-MEMBER TOOL MOUNTED ON PLURAL ROLLS:

This subclass is indented under the class definition. Means wherein a tool is, or is carried on, an endless band maintained or stretched about two or more pulleys.

SEE OR SEARCH THIS CLASS, SUBCLASS:

296+, for a machine employing an endless band tool.

SEE OR SEARCH CLASS:

83, Cutting, subclass 200.1 and the search notes thereto for a cutting tool mounted on an endless band which is stretched about two more pulleys.

474, Endless Belt Power Transmission Systems or Components, particularly subclasses 202+ and 237+ for an endless drive belt.

490 TOOL SUPPORT FOR FLEXIBLE-MEMBER TOOL:

This subclass is indented under the class definition. Device including an element or assembly of elements at least one of which is connected to a flexible-member tool for supporting it against gravity and that partakes of all the movement of the tool and has no relative movement with respect to the tool during operation of the class type.

(1) Note. A flexible-member tool when mounted on its support will not necessarily be flexible in operation or use due to rigidity of the support.

SEE OR SEARCH THIS CLASS, SUBCLASS:

65+, 168+, 296+, and 313+, for machines with flexible tools.

330+, for flexible abrasive tools mounted on an expansible carrier.

352, for a portable floor machine having a rotary cylinder.

458, for a device for applying a sheet to a holder.

526, for the definition of "flexible-member tool".

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclasses 230+, and more specifically subclass 230.19 for means to secure a tool to a support.

30, Cutlery, subclasses 451+ for a static pencil-sharpening implement including a flexible-member abrading tool and a support therefore.

34, Drying and Gas or Vapor Contact With Solids, subclasses 95+ for the combination of a holder and a bibulous absorbent sheet constituting a drying device (e.g., blotter); particularly subclasses 95.1+ for such a device which is hand-manipulable.

51, Abrasive Tool Making Process, Materials, and Compositions, for a flexible abrasive tool distinguished solely by the abrasive composition.

101, Printing, subclass 415.1 for a flexible sheet securing device.

433, Dentistry, subclasses 134+ for a dental abrading tool mandrel for supporting a grinding disk.

492, Roll or Roller, subclasses 22+ for a roll, per se, with a sheet edge holder.

491 With tool supply or storage:

This subclass is indented under subclass 490. Tool support also for holding on or in the support tool member or material in addition to that already in position for, or in, use.

SEE OR SEARCH THIS CLASS, SUBCLASS:

458, for a device for applying a sheet to its holder.

467, for a tool carrier having an additional tool supply.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclasses 231+ for a holder for a sheet form wiper.

34, Drying and Gas or Vapor Contact With Solids, subclasses 95.1+ for a manually manipulable blotting device including means for supporting or containing additional blotting material.

492 Coiled tool:

This subclass is indented under subclass 491. Tool support wherein the tool supply is a spirally wound web of indeterminate length material which is dispensed as needed.

493 On spool or axle:

This subclass is indented under subclass 492. Tool support wherein the coil of tool material is held or mounted on a core within the coil.

494 Having magnetic or suction tool holding means:

This subclass is indented under subclass 490. Tool support having means to secure the tool to a support by a body capable of attracting ferromagnetic material or by subatmospheric air pressure (e.g., vacuum).

495 Contour-adjustable support:

This subclass is indented under subclass 490. Tool support wherein the shape of that portion of the support which is separated from the work by only the tool, can be changed or altered prior to use to allow the tool to conform to the shape of the work during use.

(1) Note. This subclass does not provide for mere resiliency of the support to conform to the work shape. Disclosure of such a characteristic may be found anywhere within the flexible-member tool subclasses.

496 Including tool holding slot in rotary tool support:

This subclass is indented under subclass 490. Tool support including a support that turns about an axis and has a groove or line of separation therein that extends along the axis, into which groove or separation a margin or other portion of the tool is inserted.

(1) Note. To be included in this subclass positive disclosure of a means to rotate the support is not required, but the disclosure should clearly indicate a rotary support.

SEE OR SEARCH THIS CLASS, SUBCLASS:

178+, for a rotary peripheral face tool, and see the notes thereto.

502+, for a tool support having a nonrotary support having a tool holding slot.

SEE OR SEARCH CLASS:

34, Drying and Gas or Vapor Contact With Solids, subclass 95.3 for a rotary blotting device which is slotted to retain sheet blotting material.

464, Rotary Shafts, Gudgeons, Housings, and Flexible Couplings for Rotary Shafts, for a flexible coupling between a torque transmitting shaft and a driven member.

474, Endless Belt Power Transmission Systems or Components, particularly subclasses 152+ and 166+ for a positive drive or friction drive pulley.

492, Roll or Roller, for a roll, per se, not elsewhere provided for, and see the notes thereto for other rolls and combinations involving rolls.

497 Separable along slot:

This subclass is indented under subclass 496. Tool support which can be parted along the line of separation to receive and hold the tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:

503, for a nonrotary support separable along tool holding slot.

498 Diametrically separable:

This subclass is indented under subclass 497. Tool support which can be parted to receive and hold the tool along either of (a) two lines of separation lying in an axial plane or (b) one line of separation which lies in the axial plane which contains a line about which the two separable halves of the support pivot with respect to each other.

499 With tool tensioning means:

This subclass is indented under subclass 496. Tool support provided with means within the groove or separation for pulling a portion of the tool into the slot, thereby causing the tool to be taut about its support.

SEE OR SEARCH CLASS:

76, Metal Tools and Implements, Making, subclasses 81.1+ for a support having means for tensioning a stropping tool thereon.

500 By rotary gripping element:

This subclass is indented under subclass 499. Tool support wherein the tensioning means includes a device in frictional engagement with the tool, which device rotates to cause the tautness of the tool while maintaining its frictional contact with the tool.

501 Including threaded element:

This subclass is indented under subclass 499. Tool support in which the tool tensioning means is actuated by helical screw means.

502 Including longitudinal tool holding slot:

This subclass is indented under subclass 490. Tool support having a support having three dimensions one of which is longer than either of the others, along which longer dimension extends a groove or line of separation, into which a margin or other portion of the tool is inserted.

SEE OR SEARCH THIS CLASS, SUBCLASS:

496+, for a rotary support having a tool holding slot.

503 Separable along slot:

This subclass is indented under subclass 502. Tool support wherein the support is divided along the line of separation thus forming the tool receiving opening.

SEE OR SEARCH THIS CLASS, SUBCLASS:

497+, for a rotary tool support separable along the tool holding slot.

504 Including expansible external surface:

This subclass is indented under subclass 490. Tool support wherein the outer effective tool engaging area of the support is increased for frictionally securing the tool to its support.

SEE OR SEARCH THIS CLASS, SUBCLASS:

463+, for a tool carrier wherein the effective tool engaging surface is increased by the outward or inward movement of the tool.

505 Hydraulically actuated:
This subclass is indented under subclass 504. Tool support wherein expansion of the external surface is caused by a gas or liquid under pressure.

SEE OR SEARCH THIS CLASS, SUBCLASS:
481, for a fluid expanding tool carrier.

SEE OR SEARCH CLASS:
492, Roll or Roller, subclasses 4+ for rolls, per se, which are inflatable.

506 Centrifugally actuated:
This subclass is indented under subclass 504. Tool support wherein expansion of the external surface is caused by the outward force resulting from rapid rotation.

SEE OR SEARCH THIS CLASS, SUBCLASS:
465+, for centrifugally expanded carriers adapted to frictionally secure a flexible-member tool thereto.

507 Actuated by compression of support:
This subclass is indented under subclass 504. Tool support wherein expansion of the external surface is caused by compaction of the dimension of the support that is parallel to that surface.

508 Including headed, axially disposed, tool holding member on rotary support:
This subclass is indented under subclass 490. Tool support having a support that turns about an axis, and means for securing the tool to the support comprising an element that extends along such axis, and engages an area of the tool surface which is small relative to the entire surface of the tool, and clamps the so engaged area between the tool support and itself.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing, and General Cleaning, subclasses 230+ and more specifically subclass 230.19 for axially-headed means to secure a cleaning or polishing tool to a support.

509 Tool holding member disconnected from support by partial rotation:
This subclass is indented under subclass 508. Tool support wherein the tool securing means is held to the support by a joint that permits release of the means by arcuate movement thereof or of another means acting therewith to form the joint.

510 With threaded means to retain tool holding member:
This subclass is indented under subclass 508. Tool support wherein the tool securing means is held relative to the support by helical screw means.

(1) Note. The element itself may or may not be threaded.

SEE OR SEARCH THIS CLASS, SUBCLASS:
521+, for threaded means securing a tool to a nonrotary support.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing and General Cleaning, subclass 230.19 for threaded means securing a nonabrading tool to a support.

511 Including conical tool holding member:
This subclass is indented under subclass 510. Tool support having means for securing the tool to a support, which securing means is in the shape of a cone.

(1) Note. The conical surface may be either protuberant or depressed.

512 Including taper or wedge tool holding member:
This subclass is indented under subclass 490. Tool support having means for securing the tool to a support, which securing means has a configuration defined by a cone (or conelike surface) or by intersecting planes.

513 Including endless band tool holding member:
This subclass is indented under subclass 490. Tool support having means for securing the tool to a support, which securing means comprises a ring or hoop forming a continuous

clamping element entirely surrounding the tool.

(1) Note. The element may or may not be resilient or elastic.

SEE OR SEARCH THIS CLASS, SUBCLASS:
514+, for other resilient tool securing means.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing, and General Cleaning, subclasses 230+ for a ring or hoop securing a cleaning or polishing tool to a support.

514 Including resiliently urged tool holding member:
This subclass is indented under subclass 490. Tool support wherein the tool is secured to the support by an element or assemblage of elements which is yieldingly biased into or away from tool securing position.

SEE OR SEARCH THIS CLASS, SUBCLASS:
499+, for resiliently urged tool holding means on a rotary support.

515 Separable:
This subclass is indented under subclass 514. Tool support wherein the tool holding means (i.e., element or assemblage) is removable as a whole from the support, as for allowing insertion or removal of the tool relative to the support.

516 Rotatable:
This subclass is indented under subclass 514. Tool support wherein the tool holding means (i.e., element or assemblage) constitutes or is carried by a radial extension of or projection from an axle mounted for rotation in the tool support or a member attached thereto.

(1) Note. A member secured at one end and arcuately bendable about said end is excluded from this subclass and may be found in appropriate subclasses of the group (subclasses 514+).

517 Biased for tool disengagement:
This subclass is indented under subclass 514. Tool support wherein the tool holding means is yieldingly urged away from the tool securing position and is held in position securely by a releasable keeper.

518 Cantilever-spring actuated:
This subclass is indented under subclass 514. Tool support wherein the tool holding means includes a resilient member which is rigidly connected to the support at one end thereof which urges the tool in a direction toward the workpiece.

519 Coil-spring actuated:
This subclass is indented under subclass 514. Tool support wherein the tool holding means includes a resilient member in the form of a helix, wound about a centerline, which urges the tool engaging portion thereof toward the tool in a direction generally along such centerline.

520 Including tool holder having tool surface depressor:
This subclass is indented under subclass 490. Tool support in which the tool securing means serves to cause a portion of the surface to be recessed relative to the work engaging portion thereof.

(1) Note. Usually the tool holding means is depressed into the tool surface in order to permit operation of the tool without contact between the means and the work.

521 Including threaded means to retain tool holder:
This subclass is indented under subclass 490. Tool support including a tool securing means which is held relative to the support by helical screw means.

SEE OR SEARCH THIS CLASS, SUBCLASS:
501, for threaded means securing a tool to a rotary support having slots.

522 Including bar or plate tool holding member:
This subclass is indented under subclass 521. Tool support wherein the tool securing means includes a rod or a piece of flat stock which

engages only a small portion of the tool to secure that portion to the support.

523 Manually manipulated:
This subclass is indented under subclass 490. Tool support adapted to be held by an operative and randomly moved during the abrading operation.

SEE OR SEARCH CLASS:
34, Drying and Gas or Vapor Contact With Solids, subclasses 95.1+ for a manually manipulable, flexible blotter and a support therefor.

524 By handle:
This subclass is indented under subclass 523. Tool holder having a portion disclosed as intended to be grasped for manipulation thereof by the operative.

SEE OR SEARCH THIS CLASS, SUBCLASS:
557, for a rigid tool with an actuating handle.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing, and General Cleaning, subclasses 208+ for a fabric wiper, particularly subclass 214 for a lens cleaner.

525 Detachable from tool support:
This subclass is indented under subclass 524. Tool support wherein the handle is separable therefrom.

526 FLEXIBLE-MEMBER TOOL, PER SE:
This subclass is indented under the class definition. A bendable instrumentality having (a) a work face that includes crystalline abrasive particles (e.g., emery, sand, corundum, etc.) and a supporting structure to which such particles are secured or (b) an abrasive containing composition molded to a particular shape.

GLOSSARY

A term or phrase used in the schedule or definitions either repeatedly or in a special and limited sense is set forth below with the meaning each has in this group of subclasses (i.e., subclasses 526+). An asterisk (*) following a term or phrase in the schedule or definitions in this area indicates that it has been defined in this glossary.

COMPONENT

A distinct unitary element of a composite tool in the form of a layer* or a constituent of a layer.

FIBER

A relatively short, slender, flexible element of macroscopic size and finite length and having a width and thickness of the same order of magnitude. A fiber is generally of staple length to facilitate its being spun, twisted, or otherwise secured together into a composite strand but may be shorter length requiring bonding, felting, or matting to form a strand or layer. It may be of animal (e.g., wool, rabbit hair), vegetable (e.g., cotton, jute, hemp), or mineral (e.g., asbestos, glass, metal) origin and may be either natural, modified, or synthetic.

LAYER

A single thickness of material(s) in the form of a sheet(s) in side-by-side, coplanar relation; or particulate material arranged in continuity to constitute a distinct stratum.

SHEET

A rectangular portion of material of finite length, whose width is greater than its thickness.

527 Interrupted or composite work face (e.g., cracked, nonplanar, etc.):
This subclass is indented under subclass 526. Flexible-member tool whose abrasive surface is (a) corrugated, pleated, or grooved; (b) apertured; (c) comprised of discrete abrasive areas on the supporting structure; (d) cracked or slit; or (e) made up of sheets* or components* disposed in adjoining or contiguous relation.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing, and General Cleaning, subclass 230.14 for a cleaning tool having an interrupted or composite work face and subclass 230.16 for a cleaning tool having an interrupted work engaging surface.

528 Uniform thickness nonplanar:
This subclass is indented under subclass 527. Flexible-member tool wherein the interrupted work face is in the form of an undulating (e.g., corrugated, pleated, etc.) abrasive layer of substantially constant depth.

529 Sectional:
This subclass is indented under subclass 527. Flexible-member tool wherein the abrasive work face or layer is made up of discrete portions or zones and including such face or layer made up of a plurality of abrasive sheets or components.

(1) Note. A layer cracked such that discrete portions or zones are formed is included in this subclass.

530 Work face variegated or on projecting backing:
This subclass is indented under subclass 526. Flexible-member tool whose abrasive work engaging face comprises either (a) different sizes or kinds of abrasive particles of one uninterrupted layer* or (b) an uninterrupted abrasive layer which does not completely cover the supporting structure.

531 Splice or joint:
This subclass is indented under subclass 526. Flexible-member tool comprising either two interconnected discrete parts, either of which would constitute a flexible-member tool, or a single flexible-member tool, two edges or ends of which are interconnected by securing means.

532 Comprising fibers:
This subclass is indented under subclass 526. Flexible-member tool having abrasive material embedded in or intermingled with a relatively short, slender, flexible element of macroscopic size.

SEE OR SEARCH THIS CLASS, SUBCLASS:
533+, for an instrumentality comprising abrasive elements associated with a composite strand composed of or comprising fibers.

533 Laminate:
This subclass is indented under subclass 526. Flexible-member tool which comprises plural layers* at least one layer of which consists of or includes abrasive particles.

SEE OR SEARCH THIS CLASS, SUBCLASS:
532, for a laminate comprising a fiber layer with abrasive elements embedded in a surface thereof.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing, and General Cleaning, subclass 230.12 for cleaning tools comprising layers adhesively bound together and subclass 230.15 for a plurality of layers sewn together to form a cleaning tool.

534 Discontinuous or differential coating impregnation or bond:
This subclass is indented under subclass 533. Flexible-member tool comprising plastic facing, saturating, or joining material which is present in isolated areas, or as differing compositions, or varying in concentration or in physical characteristics; or comprising plural layers whose juncture (either adhesive or cohesive) is of different character (e.g., strong bond next to weak bond) in different areas of the tool.

(1) Note. The plastic material may be abrasive particles of different kinds.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclasses 103+, 194, and 195+ for a single or plural layer stock material product in the form of a web or sheet embodying a differential or discontinuous coating, impregnation, or bond.

535 Coil wound:
This subclass is indented under subclass 533. Flexible-member tool wherein a layer is helically or spirally wrapped (a) upon itself to form a cylinder or cone or (b) along an axis to form a cylinder or strand.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, subclass 230.13 for a spirally wound cleaning tool.

536 Integrated strands:

This subclass is indented under subclass 533. Flexible-member tool which includes a layer or component consisting of relatively narrow ribbonlike elements mechanically intertangled, interwoven, intertwined, or interlooped.

(1) Note. A patent to a product within the scope of this class and claiming a "textile" will be placed in this subclass unless the disclosure indicates that the reference is to a nonstrand textile, such as a layer of fibers, for which see subclass 532 above. The term cloth will be construed as signifying textile; the term fabric will not be so construed.

537 Non-coextensive laminae:

This subclass is indented under subclass 533. Flexible-member tool which comprises a first layer including abrasive particles, at least one edge of which is offset (either laterally or longitudinally) relative to a corresponding edge of a second layer of the tool.

538 Strippable layer or component:

This subclass is indented under subclass 533. Flexible-member tool which includes a layer or component adhered thereto by a bond, the nature of which permits relatively easy removal.

(1) Note. This subclass will receive such disclosures as a releasable protective layer covering a pressure sensitive adhesive, easily ruptured layer, or other temporarily protective layer.

(2) Note. The disclosures of this subclass are limited to a tool in which the layer or component is removable as a whole; i.e., the layer is not dissolved (washed off) or disintegrated (as by scraping). Such included disclosure may comprise preliminary softening of an adhesive by dissolution to release a layer which may then be removed bodily from the remainder.

SEE OR SEARCH CLASS:

206, Special Receptacle or Package, subclass 411 for an adhesive tape roll package from which a strip may be peeled.

427, Coating Processes, subclasses 154+ for a process of coating a substrate with a removable protective coating.

428, Stock Material or Miscellaneous Articles, subclasses 40.1+ for a plural component web or sheet in which a layer or component is removable or strippable to expose a layer of adhesive material.

539 Abrasive on one surface only:

This subclass is indented under subclass 533. Flexible-member tool in which the abrasive particles are disposed only on one face thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

527+, and 534 through 538, for a tool, per se, also having abrasive on one surface only.

540 RIGID TOOL:

This subclass is indented under the class definition. Inflexible instrumentality having (a) a work face that includes crystalline abrasive particles (e.g., emery, sand, corundum, etc.) and a supporting structure to which such particles are secured or (b) an abrasive containing composition molded to a particular shape.

SEE OR SEARCH THIS CLASS, SUBCLASS:

463+, for an expansible tool.

SEE OR SEARCH CLASS:

51, Abrasive Tool Making Process, Material, or Composition, for a rigid abrasive tool distinguished solely by the abrasive composition.

241, Solid Material Comminution or Disintegration, subclasses 291+, especially subclasses 293+ for similar elements used in comminution.

541 Rotary cylinder:

This subclass is indented under subclass 540. Rigid tool of a shape of a solid generated by a circle moving axially, which tool is intended to

turn about its axis and engage to abrade the work by the peripheral surface that is parallel to the axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:

178+, for rotary, a peripheral face tool, and see the notes thereto.

SEE OR SEARCH CLASS:

12, Boot and Shoe Making, subclass 70 and 104 for a burnishing machine or tool.

492, Roll or Roller, for a roll, per se, not elsewhere provided for, and see the notes thereto for other loci for a roll or combination involving a roll.

542 Circular segments:

This subclass is indented under subclass 541. Rotary cylindrical abrading tool comprised of a plurality of preformed blocks of material containing an abrasive which when assembled together, along the circumference of a circle, form a complete cylinder or cylindrical annulus.

(1) Note. The blocks of material may be claimed with or without other means for holding, cementing, or spacing the blocks.

SEE OR SEARCH THIS CLASS, SUBCLASS:

541+, the parent of this subclass, for a tool formed from a single monolithic or molded piece, even though the abrading surfaces may be discontinuous.

544, for a tool which is formed of a plurality of blocks of material containing an abrasive but in which each of the blocks forms a complete cylindrical abrading surface.

SEE OR SEARCH CLASS:

492, Roll or Roller, subclasses 30+ for a roll, per se, comprising segmental sections.

543 Detachable:

This subclass is indented under subclass 542. Rotary cylindrical abrading tool in which the blocks of material containing the abrasive can be assembled or disassembled without the destruction of either the blocks or the means for holding or spacing the blocks.

544 Laminated:

This subclass is indented under subclass 541. Rotary cylindrical abrading tool of a rigid or inflexible character composed of plural layers of abrading material.

SEE OR SEARCH CLASS:

51, Abrasive Tool Making Process, Material, or Composition, subclass 297 for an abrasive tool manufacturing process involving.

138, Pipes and Tubular Conduits, for a laminated tubular product not elsewhere provided for.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for a laminating process, especially subclasses 184+ for the manufacture of a wound laminated cylinder.

428, Stock Material or Miscellaneous Articles, for a single or plural layer stock material product in the form of a web, sheet, rod, or strand which may include a layer of particulate material; see especially subclass 87, 143+, 206+, 323+, 372, and 402+, all of which subclasses have “particulate matter” in their titles.

442, Fabric (Woven, Knitted, or Nonwoven Textile or Cloth, etc.), subclasses 68+, 70, 72+, and 74+ for a coated or impregnated fabric which contains particulate materials.

492, Roll or Roller, subclasses 30+ for a roll, per se, not elsewhere provided for, having annular axial sections.

545 Work guide:

This subclass is indented under subclass 541. Rotary cylindrical abrading tool of a rigid or inflexible character provided with a guide to position the work, as a knife blade, at the proper angle to the tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:

267, 282, 365, 549, and 555, for other work guides.

SEE OR SEARCH CLASS:
76, Metal Tools and Implements, Making, subclasses 88+.

546 Reinforced:
This subclass is indented under subclass 541. Rotary cylindrical abrading tool imbedded with a strengthening material.

(1) Note. The strengthening material may be wire mesh, fiber glass, polymer or resin compound, etc.

SEE OR SEARCH CLASS:
51, Abrasive Tool Making Process, Material or Composition, for a process of making a reinforced abrasive tool.

547 Ribbed periphery:
This subclass is indented under subclass 541. Rotary cylindrical abrading tool in which the cylindrical surface of the tool is formed by a single monolithic or molded piece provided with a regular pattern of raised abrasive regions, such as circumferential ridges or helical formations.

SEE OR SEARCH THIS CLASS, SUBCLASS:
542, for a rotary tool having a discontinuous segmented surface formed by a plurality of abrasive blocks.

548 Rotary disk:
This subclass is indented under subclass 540. Rigid tool including a circular, planar surface, which tool is intended to turn about an axis normal to and passing through that surface to abrade the work by that surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:
158+, 259+, 353, and 359, for other rotary abrading disk tools.

SEE OR SEARCH CLASS:
125, Stone Working, subclass 3 and 28 for rotary tool stone dressing apparatus.

549 Work guide:
This subclass is indented under subclass 548. Rotary disk abrading tool provided with a member or a holder to facilitate the application of the tool to the workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:
267, 282, 545, and 555, for other work guides.

SEE OR SEARCH CLASS:
76, Metal Tools and Implements, Making, subclasses 88+ for a cutting tool sharpener (other than abrasive), cutter and guide.

550 Disk laps:
This subclass is indented under subclass 548. Rotary disk abrading tool specifically disclosed for use in polishing a work surface in the presence of a fluent abradant.

SEE OR SEARCH THIS CLASS, SUBCLASS:
450, for a similar mechanism for applying a liquid coolant to a grinding tool.

551 Scroll:
This subclass is indented under subclass 548. Rotary disk abrading tool wherein the working surface is formed with a network of raised curvilinear surfaces.

552 Stationary:
This subclass is indented under subclass 540. Rigid abrading tool that is nonmoving and to which the work is to be applied to accomplish the abrading.

(1) Note. A hone or a whetstone is included herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:
312+, for a stationary tool machine.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclasses 544+ for stock materials (e.g., of indefinite length) which are all metal or have adjacent metal components.

553 Metal:
This subclass is indented under subclass 552. Rigid, stationary abrading tool in which the abrading surface is of metal.

SEE OR SEARCH CLASS:
76, Metal Tools and Implements, Making, subclass 84 for a butchers' steel used in sharpening a cutting edge.
428, Stock Material or Miscellaneous Articles, subclasses 544+ for stock material (e.g., of indefinite length) which is all metal or has adjacent metal components.

554 Having oiler or moistener:
This subclass is indented under subclass 552. Rigid, stationary abrading tool having means for supplying a lubricant to the abrading surface.

555 Work guide:
This subclass is indented under subclass 552. Rigid, stationary abrading tool provided with a member or a holder to facilitate the application of the tool to the workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:
241, 267, 283, 558, and 545, for other work guides.

SEE OR SEARCH CLASS:
76, Metal Tools and Implements, Making, subclass 82 for a cutter with a guide used in making a tool.

556 Razor hone:
This subclass is indented under subclass 552. Rigid, stationary tool for sharpening the cutting edge of a razor.

SEE OR SEARCH THIS CLASS, SUBCLASS:
319, for other stationary blade sharpeners.

SEE OR SEARCH CLASS:
76, Metal Tools and Implements, Making, digest 8 for an art collection directed to razor blade manufacturing.

557 Having actuating handle:
This subclass is indented under subclass 540. Rigid tool provided with a portion disclosed as intended to be grasped by an operative for manipulation thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:
526+, for corresponding flexible tools.

SEE OR SEARCH CLASS:
76, Metal Tools and Implements, Making, subclass 84 for a butchers' steel.

558 Work guide:
This subclass is indented under subclass 557. Rigid abrading tool provided with a member for directing the motion of the tool on the work.

SEE OR SEARCH THIS CLASS, SUBCLASS:
241, 267, 282, 438, 549, and 555, for other work guides.

SEE OR SEARCH CLASS:
76, Metal Tools and Implements, Making, subclasses 82+ for making a cutting tool, generally, including use of a work guide.

559 MISCELLANEOUS:
This subclass is indented under the class definition. Invention not strictly falling under any other subclass in this class either because of some inherent abrading distinction or because it is involving an operation which in itself or in combination is only doubtfully classifiable as an abrading operation or because the operation involved is merely cognate or accessory to some abrading operation without being sufficiently distinct to warrant assignment to another art.

CROSS-REFERENCE ART COLLECTIONS

The following subclasses are collections of published disclosures pertaining to various specified aspects of the abrading art. These specified aspects do not form appropriate bases for subclasses in the foregoing classification (i.e., subclasses superior hereto in the schedule) wherein original copies of patents are placed on the basis of proximate function of the apparatus. These sub-

classes assist a search based on remote function of the apparatus and may be of further assistance to the searcher, either as a starting point in searching this class or as an indication of further related fields of search inside or outside the class. Thus, there is here provided a second access for retrieval of a limited number of types of disclosures.

(1) Note. Disclosures are placed in these subclasses for their value as references and as leads to appropriate main or secondary fields of search, without regard to their original classification or their claimed subject matter.

(2) Note. The disclosures found in the following subclasses are examples, only, of the indicated subject matter, and in no instance do they represent the entire extent of the prior art.

900 GEAR ABRADER:
Disclosure of a device particular to formation or surfacing of a force transmitting gear.

901 SUPER FINISH:
Disclosure of providing an unusually high luster to a workpiece by abrading.

902 BRAKE ABRADING:
Disclosure of grinding a brake drum, disk, shoe, or pad.

903 EGG CLEANING:
Disclosure of removing foreign material from an egg.

904 FLEXIBLE ABRASIVE STORAGE REEL:
Disclosure of an abrading device with a compartment or spool to store several convolutions of flexible abrasive material.

905 METAL LAP:
Disclosure of means to grind comprising a member of metal which generally conforms to the desired shape of a workpiece to which is loosely applied crystalline material for grinding the workpiece by movement of the member with respect thereto.

906 MACHINE ELEMENT OR UNIT:
Disclosure of a subcombination of structure of this class, not provided for in the "official" subclasses above.

907 STRIP FEEDING:
Disclosure of presenting an elongated workpiece toward a grinding means.

908 ELECTRICAL ABRADING:
Disclosure of grinding of surface material from a workpiece while passing electrical current therethrough.

909 WIRE POLISHING:
Disclosure particular to surface smoothing of a small metallic elongated strand.

910 ULTRASONIC:
Disclosure of abrading wherein vibrational energy of higher frequency than detected by normal human hearing is utilized.

SEE OR SEARCH THIS CLASS, SUBCLASS:
165, for an abrading machine having a rectilinearly reciprocating tool that vibrates ultrasonically.

911 TOOL MOUNTING POINT:
Disclosure of a support for an abrading tool comprising a rodlike member having a securing provision to hold the tool at its axial tip.

912 SHOE ABRADING:
Disclosure of abrading in the formation of or treatment of a shoe or boot.

913 CONTOUR ABRADING:
Disclosure particular to the grinding of a smooth, uniformly curved surface.

914 SUPPORTING, POSITIONING, OR FEEDING WORK:
Disclosure of holding a workpiece against gravity, manipulating a workpiece with respect to an abrading means, or advancing a workpiece with respect to an abrading means, of a type not provided for in the "official" subclasses above.

915 ABRADING WHEEL SPEED CONTROL:
Disclosure of regulating the rotational velocity of a grinding disk or drum.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

1+, for abrading with use of a condition responsive control.

END

916 ABRADING OF BRUSH BRISTLE:
Disclosure of grinding bristles of a brush.

917 ABRADING OF SCALLOPED CUTTING EDGE (E.G., BREAD KNIFE SHARPENING):
Disclosure of grinding a regularly pointed sharp cutting edge.

(1) Note. The cutting edge of the disclosure of this subclass is shaped somewhat like a saw blade, except the valleys as well as the points are sharpened.

918 ADJUSTABLE WORK SUPPORT (E.G., BY SINE BAR):
Disclosure of repositionable means to support a workpiece not provided for in the "official" subclasses above.

(1) Note. A sine bar, included herein, serves to establish the vertical dimension of the angle of the work support (i.e., the sine of the angle).

919 WANKEL:
Disclosure particularly to abrading a trochoical cylinder.

SEE OR SEARCH CLASS:

123, Internal-Combustion Engines, subclass 241 for a Wankel engine.

418, Rotary Expansible Chamber Devices, subclass 61.2 for a Wankel-type expansible chamber device.

920 TIRE "ROUNDING":
Disclosure of abrading to correct the exterior periphery of a vehicle tire.

921 "PAD" FOR LENS SHAPING TOOL:
Disclosure of an accessory to be used in abrading an optical lens to cushion a lens engaging portion to prevent undesired modification of the lens.

(1) Note. The pad of this subclass may prevent scratching or cracking of the lens.